amateur radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

JUNE, 1973

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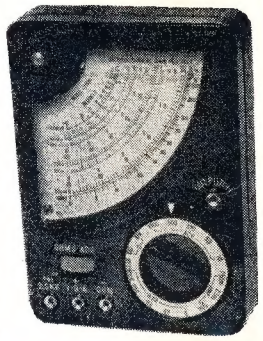

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Editor:
Bill Roper VK3ARZ

Assistant Editor:
Bruce Bathols VK3ASE

Publications Committee:
John Adcock VK3ACA
Rodney Champness VK3UG
Syd Clark VK3ASC
Bob Dorin VK3ZU
Ron Fisher VK3OM
Ken Gillespie VK3GK
Neil Osborne* VK3YEI
Bill Rice VK3ABP
Peter Wolfenden VK3ZPA

Contributing Editors:
Deane Blackman VK3TX
Peter Brown VK4PJ
Don Grantley
Eric Jamieson VK5LP
Geoff Wilson VK3AMK

Drafting Assistants:
Andrew Davis VK1DA
Gordon Row L30187

Business Manager:
Peter B. Dodd VK3CIF

Publishing Associate :
Les Gough VK3ZH

Enquiries and material to:
The Editor, Phone (03) 24-8652.
P.O. Box 150, Toorak, Vic., 3142.

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Barry Hartley, VK2FE, Publicity Officer of the W.I.A. Illawarra branch sent this picture of the Dapto Dish used in recent E.M.E. tests with K2UYH and W6FZJ. Signals were heard from K2UYH on 10th March at better strength than previously, probably due to the use of an MT4578 receiving preamp in place of the BFR91. The transmissions were acknowledged. A similar test on the same day with W6FZJ however, resulted in the receipt of weak signals possibly caused by rain in the feed system at the transmitting end.

QSP

REPEATERS

Nearly all the readers of A.R. will be aware of current discussions concerning a 2 metre band plan in relation particularly to repeater channels and F.M. Simplex channels. At the 1973 Easter Convention, the 1973 2 metre band plan was evolved and this plan was described in brief on page 2 of last months A.R The "Albury" band plan recommendations were set out on page 15 in A.R. of August, 1972, and the "Wodonga" band plan was reported on page 17 in A.R. of November 1968. The 1973 band plan is under fire and a postal vote is under way to Divisions. In an attempt to place the viewpoint of Divisions before the readers of A.R. each Divisional Federal Councillor was requested, as a matter of urgency, to set out his views and those which were received in time are printed below

NEW SOUTH WALES:

Why Repeaters should follow the Wodonga Plan.

Following the conception of the 1973 2 Metre Band Plan and the various inter Divisional discussions which resulted from trying to find a suitable alternative which would satisfy all the requirements of those Divisions most vocal in the matter, the New South Wales Division set about finding out what justification existed for changing the present system.

Before seeking information from overseas we attempted to find out why change was being sought. From our enquiries it would appear that other States wish to change because:

(a) Concern is felt that interference to the satellite will come from ground based repeaters or interference to repeater users would result from stations working the satellite.

(b) It was avowed that satellites will require to operate between 144 and 146 MHz and we should therefore vacate this area and leave it wholly to satellite use.

(c) Australian Amateur Repeater operation should be the same as that used in the USA, i.e. above 146 MHz on 600 KHz spacing between input and output frequency on the Repeater.

(d) More Repeater Channels are needed and now should be the time to make any changes which may be necessary.

(e) Any provisions made should cater for the simplex channels and be capable of being used with currently available equipment.

The New South Wales Council called a meeting of Council and invited each active Repeater Group to send Representatives. Other interested groups were also invited. At this meeting it was decided to contact the ARRL, IARU HQ. AMSAT and any other organisation or person capable of assisting in providing reliable information.

Telephone calls were lodged and extensive discussions were held with Dr. Perry Klein, President of AMSAT, Mr. Bill Dunkerley, Member of the Board of ARRL and AMSAT and Editor in Chief of QST and Wayne Green, Editor of "73" Magazine and the information received was as follows:

AMSAT recognise that a free band from 145.85 to 146 MHz is the best they can hope for internationally and hence their future planning centres on the spectrum 145.85 to 145.95 between which points Odb response into the satellite will be provided.

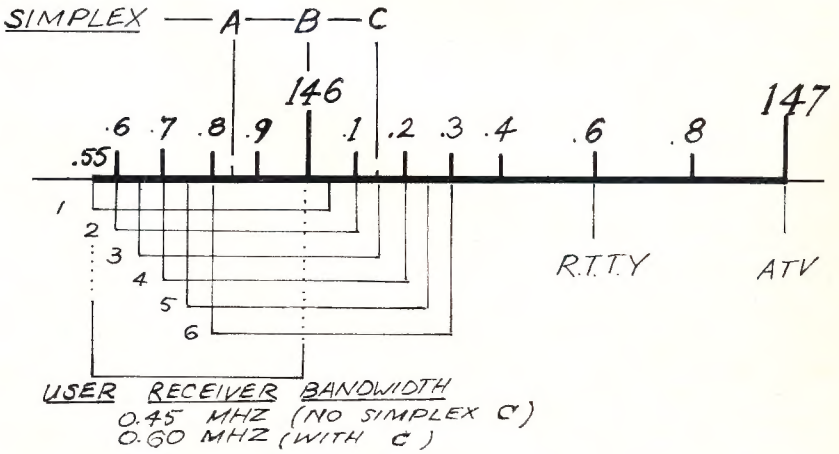
At 145.80 and 146 MHz the satellite receiver will be 10db down on that in midband and hence as 100W ERP is required to work the satellite safely then 1KW ERP would be required at 145.8 and 146 MHz if one wishes to work through the satellite.

Perry stated that AMSAT were trying through the IARU to get an International agreement on Satellite frequencies and at the moment this would most likely be from 145.8 to 146. AMSAT see no problems from our repeaters if their output frequencies are at 145.8 or lower and in particular if they follow the IARU Region 1 Scheme, they will be taken into account in all future satellite operations together with European repeaters.

Perry Klein further stated that he had been informed that all States in Australia wanted to change repeaters to above 146 MHz and with this he stated he would have no argument, however he did not agree that any necessity existed from AMSAT's point of view that we should do more than remove the Channel 4 Repeater output channel from 145.9 and not allocate repeater output frequencies between 145.825 and 146 MHz.

The information from Bill Dunkerley and Wayne Green confirmed what Perry Klein had stated and Bill Dunkerley and Perry Klein stated they had jointly discussed the Australian problem and both ARRL and AMSAT officially concurred with what has been stated above.

The New South Wales Division therefore cannot agree that a repeater change is required because of future satellite operation and considers that those that argue this way are expressing their own opinions and not the opinions of the group charged with providing satellite services and we therefore suggest the existing Wodonga based scheme be expanded as shown in the diagram below:



It will be obvious that continuing with the Wodonga scheme ensures:

1. Users of Channels A, B & C simplex will not have to relocate to another set of simplex standards (If the Albury scheme is adopted present equipment will not cater for the new Channel 4 and Channel A or B without either B or 4 suffering attenuation).

2. A receiver bandwidth of 0.60 MHz is required to receive all repeater and Simplex channels and only 0.45 MHz if Channel C is not used. (The Albury Plan requires 1.15 MHz bandwidth to receive from Simplex A to Channel 4).

3. That only Channel 4 crystals become redundant, old Channel 1 Crystals become usable as Channel 2 of the new system. All simplex channels remain unchanged.

4. A total of six Repeater channels is provided at 50 KHz spacing and these could be increased to 11 channels at 25 KHz should the need arise in the future — by which time equipment having adequate selectivity would be available.

5. That if the suggested use of the New Wodonga Channel 2 for capital cities is proceeded with, Perth and Melbourne would not have to change Channels whereas if the Albury plan is adopted ALL users are affected. Due to the high prevalence of Channel B operation Channel 1 of the Albury Scheme would be required as a main Repeater Channel since, if members wish to continue Channel B operation they would have difficulty in providing front end bandspreads of 0.7 MHz to do this and trying to extend this bandwidth to the 1.15 MHz to receive both Channel 4 output and Channel A would be impossible for most Members.

6. The requirements of AMSAT are met and we have their assurance that no change would be required in the foreseeable future.

7. Changing Repeater output frequencies can be a major operation for some repeater sites where the repeater is co-sited with other Government and Commercial services. The new Wodonga system enables such change to be a minimum of 100 KHz whereas the Albury Scheme requires 800 KHz minimum and this could cause repeater sites to require re-evaluation for interference to other services, etc.

In conclusion we can see no justification exists for any change to the present system other than removal of Channel 4 and expansion of the number of available channels. Since this view is shared by AMSAT and ARRL officials (in so far as Australia is concerned) we fail to see why any major change is required.

The Council of the NSW Division,
A. MULCAHY,
President & Federal Councillor.

VICTORIA

During the past 12 months, the Victorian Division has attempted to have a logical, progressive plan for repeaters — a plan to be adopted nationally and which meets the following criteria:

1. Is consistent with present and projected Institute policy.
2. Is consistent with international requirements where amateur satellite working has to be considered.
3. Is technically acceptable.
4. Is designed to provide a minimum of conversion expense to users of the present system.
5. Is designed to make the most efficient use of the spectrum available in Australia.
6. Provides for minimum interference to non-repeater users and existing simplex channel users by using a section of the two meter spectrum not yet fully developed.
7. Is designed for expansion but in reference to 2. above.

With these points in mind a band plan was developed by all Divisiona at Albury in July 1972, submitted to Federal Executive as recommendatfons and then circulated as a postal vote for formal agreement by all Divisions.

The N.S.W. Division having a differing point of view, used section 44 of the Federal Constitution to prevent a vote being taken. This meant that the question had to be resolved at the next Federal Convention — i.e. last Easter 1973.

During the Convention held in Melbourne, a compromise band plan was suggested and agreed to — a compromise which was inconsistent with this Division's policy and the criteria listed above.

Although Council supports the right of its Federal Councillor to vote as he sees the situation at the time, subsequent inspection of the plan from the Convention showed that it was unacceptable — a fact later confirmed by other Divisions.

An attempt was made by some of this Division's repeater committee to make a compromise agreement with VK2 and seek endorsement of this by other Divisions. On the evidence available at the time this band plan seemed reasonable, although again, the criteria listed above were not met.

Subsequently the Victorian Division has been accused of breaking a verbal agreement with the N.S.W. Division — we believe that the additional evidence produced by AMSAT only confirms that it was right and proper to pursue the original policy. There is no guarantee that satellite operation will stay at between 145.8 and 146 MHz; the Amateur Satellite Service has every right to go further down if circumstances require it.

Council, therefore, believe that a compromise to suit political ends in an effort to placate minorities is not in the best interests of the Division or the Institute as a whole.

It would appear that we have all lost sight of the intention to provide the greatest benefit to all sections of the amateur service — both members and non-members together with repeater and satellite users.

In conclusion the fundamental concept has not been highlighted in any of the discussions.

During 1971 you will recall that this Institute briefed and supported the attendance of T. Clarkson ZL2AZ at the ITU conference at Geneva.

Through his and other efforts, the Amateur Satellite Service was recognised internationally with permission given to operate between 144 and 146 MHz. We believe that Australian amateurs and Institute Divisions must act to be consistent with and in the spirit of this Satellite Service it helped to create.

Continued Page 3

"SWLing Behind The Bamboo Curtain"

ALAN SHAWSMITH*—VK4SS

Pictured here is Australian journalist, Francis James. It was taken as he walked unsteadily to freedom across the Bamboo Curtain, from China to Hong Kong.

Photograph courtesy "Courier Mail", Brisbane.

Three years previously, he had been arrested by the Chinese on an alleged spy charge. He was then, almost eleven stone in body weight. A few moments after this photograph was taken, he fell to the ground unconscious. He had lost fifty pounds through malnutrition, stomach ulcers and recurring dysentery. His eyesight was impaired. He could speak only with difficulty.

After recuperating in hospital, he emerged to face a variety of questions about his treatment while in prison. He told reporters that, at one stage, he was kept in solitary confinement for three months in a dark, aireless, damp, below-ground cell. The daily diet was two bread rolls and two glasses of water. When asked how he managed to maintain his sanity, the answer he gave was **very surprising.**

He said one of his guards (there were two per shift) had confided to him that he was an ardent SWL DXer. This guard was a rankless Captain in the PLA. He smuggled into Mr. Francis' cell a twenty-three transister SW DX receiver, proudly explaining it was all "homebrew". Almost every night for nearly a month the imprisoned journalist lay huddled beneath a blanket, phones on head, listening to DX from all over. After so many months of isolation and interrogation, the sound of his native tongue, from such sessions as the BBC news and not to mention dozens of Amateurs, was a rejuvenating experience indeed.

The immediate question is — why did this guard risk his neck in this way? To have been caught, the penalty for doing such a thing, would have been severe indeed. Was it simply an act of compassion for a man cut off from his family, friends and culture? In spite of years of political imprinting about the decadent Westerner did this Chinese PLA Captain clearly see that "ALL MEN ARE BROTHERS UNDER THE SKIN?"

Or was there some other motive — and just as human? The irresistable urge to share with another and particularly a stranger, the product of his own handiwork — his own creativity; to show how well his "homebrew" receiver performed? Whatever it was, it brought the two of them together, to listen in friendship through the long nights.

Officially, S.W. reception is "permitted" by law (tolerated, rather than encouraged, might be the truer description at this moment in time, because anyone caught listening to programmes from the USSR, Taiwan, etc., can find themselves in trouble with a capital "T"). However, the Chinese people are held captive to their Government's propaganda, because factory-built sets have no provision for S.W. and only operate to receive the local broadcast stations.

But, as the Francis James story shows, it is not possible to mind-bend all the people all the time. Simple things, sports and humble hobbies, draw different people together in a remarkable way.

Mr. James reports there is now an ever increasing number of SWL DX enthusiasts building gear and radio equipment; particularly among members of the PLA. Parts are plentiful and cheap. Will these people, mostly young, be content to listen only to Chinese transmissions — No.

Winds of change eternally blow. The Peoples Republic of China is now emerging from its past isolationist policy and has opened a new dialogue with the rest of the world. Many restrictions and barriers have now been relaxed. Is it reasonable to assume that these relaxations will eventually carry down the line as far as Amateur Radio? The answer is a possible YES — in time.

Communication, be it AR or eyeball, with any added country certainly promotes International friendship and understanding. It stimulates new thought and ideas. It removes doubt and suspicion. History demonstrates clearly how quickly idealogies come and go but the humanitarian concept that ALL MEN ARE BROTHERS UNDER THE SKIN remains a permanent truism.

AR

*35 Whynot St., West End, Qld., 4101.

Mount Isa

The Mt. now has an amateur radio club of its own according to Graham Algie, L40451. Congratulations. Their President is Jain Morrison, VK4ZIG and a condition of membership is that senior members must also be W.I.A. members. Membership is listed as 16 senior members and a YRCS class of 14. Their first goal is a club building but meanwhile they appear to be concentrating on their Sunday YRCS classes and establishing a WICEN Branch.

REPEATERS

Continued from Page 2

We believe that with spectrum available it is inconsistent for any Division to maintain its equipment below 146 MHz to the detriment of the Amateur Satellite Service in this country.

To do otherwise is to pay lip service to ideals and totally abrogate Institute responsibility.

SUMMARY:

ABOVE 146 MHz — WHY?

1. Satellite Service band is 144 — 146 MHz from ITU decision — it is responsibility of WIA to encourage interference free operation for the satellite band.
2. AMSAT has always urged that maximum band width be made available within the limits. (currently 145.5 to 146.0 MHz.)
3. The F.C.C. has legislated for all U.S.A. repeaters to be above 146 MHz — we do not follow blindly but similar philosophy prevails.
4. Any reference to Region 1 (Europe) must take into account that 144—146 MHz only is available. The stringent precautions taken against interference — i.e. low power, choice of antenna, minimum carrier time, low sitting, limited service area — serve to strengthen the case for shifting repeaters out of area of conflict.
5. VHF/UHF and Australian committees have recommended above 146 MHz.
6. Interference potential below 146 MHz has been amply demonstrated in this country.

WHY THE ALBURY PLAN SPECIFICALLY?

1. Is the only plan currently proposed from any quarter that satisfies all the requirements set out above.
   This does not exclude the possibility of other band plans which fulfill the same requirement.
2. Only one crystal change is required for any existing Australian repeater channel, thus minimising financial burden to existing users.
3. Other plans proposed involved total vacation of certain channels which placed disproportionate financial burdens on certain channel users.

P. D. WILLIAMS
President
Victorian Division

QUEENSLAND

Submission: 2 Meter Band Plan — May, 1973.

1. In view of the indecisive results concerning the 2 Meter Band Plan at the Easter 1973 Convention and later communications received from VK2 and VK3 Divisions on the subject, it becomes obvious that little progress will be made unless all concerned take an objective view of the problems involved.
2. It is the view of this Division that the proposed Band Plan agreed to by a majority decision at the Albury Conference held on 8/9th July, 1972, should be adopted and implemented in its entirety.
3. Perusal of the Minutes of the Albury Conference reveal that all parts of the proposed Plan were agreed to by a substantial majority and, as the Conference was truly representative of Australian Amateurs, the decisions as recorded in the Minutes of the Meeting clearly and emphatically demonstrated the wishes of the majority of Amateurs.
4. Whilst it is realised that certain minority groups have an interest in retaining the present frequency usage, there can be no doubt that the new proposed Plan will in the long term benefit all Amateurs.
5. The recent communication from A.M.S.AT. stating that O.S.C.A.R. vehicles planned for the immediate future will use frequencies in the segment 145.8+146 MHz clearly indicates that this spectrum must be kept free of possible interference. It should be remembered that O.S.C.A.R.'s 7 and 8 are planned with increased power capabilities.
6. It can be expected that the use of the Satellite service by Amateurs will increase sharply in the years ahead especially as future Amateur Satellites are expected to allow access by transmitters with lower power capability and, due to increased satellite transmission power, less sensitive receiving equipment will be required by ground stations.
7. The Plan proposed at the Albury Conference, apart from allocating frequencies for the O.SC.A.R. programme, does make adequate provision for future repeater and simplex channel usage. Reference to the Plan does indicate that maximum use has been made of existing frequency allocations in that repeater inputs remain unchanged.
8. Although complete change may not take place immediately in all areas once the Plan has been adopted the new system will be one which will provide more channels if required in the decades ahead. It would be expected that by the time additional channels were required equipment available to Amateurs would be surplus commercial equipment or new equipment capable of operating with a channel spacing of 25 KHz, thereby doubling the number of channels available. This of course assumes a plan based on 50 KHz channel separation as outlined in the proposed Albury Plan.

Federal Councillor VK4

SOUTH AUSTRALIAN DIVISION:

A Statement on Repeater Frequency Allocations

In 1971, the S.A. Division, noting the trends in satellite operation, suggested that the existing repeater structure should be reviewed. This suggestion was ignored by the Repeater Secretariat, and no further action occurred until the Albury Conference in 1972.

Continued Page 4

Variable Voltage from a DC source

Bob Broughton VK3ZKO/T*

During a recent construction spree, VK3ZKO felt the need for a high current variable power supply to assist in the tuning of transistor R.F. power amplifiers. The two power supplies described below are the result.

Since an inexpensive design was one of the main characteristics, and since a 12V DC source was available, I decided that instead of going to the expense of buying another transformer, rectifiers, etc., I would attempt something which would drop the 12V input to the required output voltage. The first circuit (fig. 1) was very simple and appeared to work well, but it had some disadvantages. The main one was a high variation of output voltage with changes of load. This turned out to be most inconvenient when trying to tune the transistors. The output voltage had to be adjusted at almost every tuning adjustment. However, for those who wish to try this circuit some details are included.

The construction is very simple, but the 2N3055 must be mounted on a heatsink. I mounted mine on the outside of the small box holding the rest of the circuit. The potentiometer (RV) should have a logarithmic taper to obtain a more linear output swing. The minimum voltage (with a 6 ohm load) was found to be about 0.2 volts and the maximum about 10 volts. The maximum voltage is very dependent on the load resistance. For instance, under test the output varied between 2.3 volts and 9.5 volts with a load of between 1 ohm and 10 ohms (RV = 4.7K ohms).

*9/38 Wattletree Rd., Armadale, Vic. 3143.

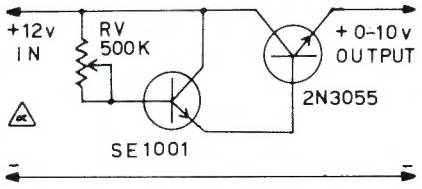


FIGURE 1

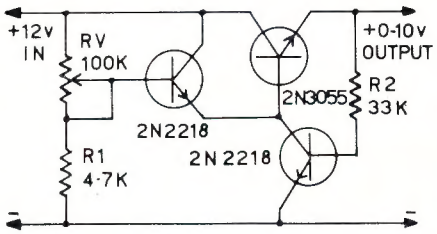


FIGURE 2

A number of circuits later (and two melted transistors) the circuit shown in figure 2 was arrived at. This circuit eliminated most of the disadvantages of the first effort. The resistance (emitter to collector) of Q1 is effectively varied by variation of RV, hense varying the bias on Q3. Q2 takes its bias from the output voltage rail, and provides a fair degree of regulation. The value of R2 is a compromise between good regulation and overheating Q2. Variations of output voltage caused by load changes, cause Q2 to shunt a portion of the bias on Q3, compensating for the output change. In each of the circuits the 2N3055 acts as a variable resistor in series with the supply.

The output voltage swing was found to be somewhere between linear and logarithmic with changes of RV, so RV was made linear. Adjustment is fairly linear over the range.

Again it is essential to provide adequate heatsinks for all of the transistors. The transistor I chose for Q1 and Q2 is a 2N2218, a rather elderly medium-powered switching transistor which happened to be in the box. Any similar switching or audio transistor will do, providing it has a maximum Ic of 800 mA or more. Before mounting Q1 and Q2 on a common heatsink check them to make sure the collectors aren't connected to their metal cases. If they are, like the 2N2218, they will have to be mounted on separate heatsinks.

The minimum output voltage of this circuit was found to be about 0.5 volts; the maximum about 10.5 volts. Output voltage swing was less than 0.6 volts for a load change from 100 ohms to 2.7 ohms. Tests below this load resistance became impractible — I kept blowing up the resistors before I could get a reading. However, the circuit should supply up to at least 5 amps before serious drop in output voltage is experienced.

AR

REPEATERS

Continued from Page 3

The Albury plan was accepted by a General Meeting of the Division late in 1972 and the Federal Councillor was directed to vote in favour of the Albury plan as outlined in the relevant postal motion. This postal motion was adjourned by the application of Article 44 of the Federal Constitution by the N.S.W. Division.

At the 1973 Federal Convention, faced with the situation of the N.S.W. and Vic. Councillors having specific voting instructions on repeater frequency allocations which were in direct opposition, the S.A. Division accepted a compromise plan. This plan was unwieldly, but as least was acceptable to all parties at the Convention. It satisfied our main objective, which was to clear the satellite area of repeaters, and also involved repeater operators in minimum cash outlay for new crystals. This plan was denoted as the 1973 Repeater Plan.

Despite acceptance of this plan at the Convention (on Sunday 22nd April to be precise), on Tuesday 1st May the N.S.W. and Vic. Divisions held a telephone conference and decided on a new plan which was forwarded to this Division by telephone on 2nd May. This new plan did not clear the satellite area as we desired, did not make as many repeater or simplex channels available as either the Albury or 1973 plans, and additionally involved all channel 4 users in the purchase of new crystals for both transmitter and receiver. Only Channel 1 remained untouched. The N.S.W. Division offered to buy any crystals already purchased for the Albury Channel 4 proposal. IN BRIEF, THIS PLAN INVOLVED THE N.S.W. DIVISION IN GREATER OUTLAY THAN THE ALBURY PLAN WITH NONE OF THE ALBURY PLAN ADVANTAGES.

The proposal was quite unacceptable to the S.A. Division, but before we could forward any comment we were advised (on 3rd May) that the Vic. Division were withdrawing their support for the joint plan in view of the advised satellite requirements and would instead press for the immediate adoption of the Albury plan in toto. The Queensland Division indicated that they would support the Vic. Division in this proposal.

We feel that as the N.S.W. Division were prepared to make such major concessions as required for the joint plan they should be prepared to accept the Albury plan which is satisfactory to the South Australian Division and apparently to the majority of other Divisions without further delay. The S.A. Division will vote in favour of adopting the Albury plan in any forthcoming postal motion.

Signed G. M. Taylor
Federal Councillor
S.A. Division

Federal Convention

The next Federal Convention, as decided unanimously at Easter, will be held in New South Wales at the invitation of that Division. It is interesting to observe that the term "Federal Convention" is defined in the articles as meaning the Annual General Meeting to be held in the month of March, April or May each year. Any other meeting is called an Extraordinary Convention.

6 metres

Fred Stirk, VK2ABC, sent a photocopy of two QSL cards confirming six metre phone contacts with KH6PP and VK9XK on 3rd May, 1950, and 6th January, 1952. He wonders if these could be claimed as firsts on six metres. Can anybody pre-date these?

Nicaragua Earthquake

Writing in a circular, YN1VMD, Secretary of the Club de Radio Experimentadores de Nicaragua, Apartado 925, Managua, alludes to the disaster in Managua last December in which the writer lost his QTH along with many other amateurs and friends. He gives thanks to everybody who cooperated in the emergency and states that the club wishes to construct a special trailer equipped with radio gear and power plant for use in the future. However, their club has almost no money but hopes that other amateurs might take pity on them by a donation.

Technical Articles

The Publications Committee recently re-organised and reviewed the flow of technical articles following upon the change of printer. One or two have suffered some delay but are being re-processed whilst others are appearing in print within a couple of months after receipt. However, a magazine such as A.R. is a very hungry animal for technical articles so please keep them coming in.

Illicit broadcasts

The APO News of May '73 features an article with the subheadline "The number of unlicensed operators of radio communication apparatus in Australia is growing, and the Post office is stepping up its war against offenders."

HF Beacons

VE3TEN on 28.175 MHz in Ottawa, GB3SX, on 28.185 MHz in Crowborough, 3B8MS on 28.190 MHz on Signal Mount in Mauritius and DL1IGI on 28.195 and 28.200 (15-20 & 45-50 mins. past each hour) near Salzburg, also DL0AR on 29.000 MHz. (IARU Reg. 1. News Apr. '73).

China

The People's Republic of China has acceded to the International Telecommunication Convention, 1965, but has made three statements including reservations concerning the assignment and utilisation of radio frequencies in the Radio Regulations. The form of call signs to be issued to amateur stations is the letter B followed by a letter designating the geographical area (e.g. U-Sinkiang) followed by a single digit and the letter A or A with one or two letters. (IARU Region 1 News, Apr. '73).

Restrictions on the Amateur Service

"But let the (F.C.C.) Commission not for a moment forget it is dealing with **amateur** radio. We take part in it because of the love of the game, the challenge, the satisfaction. The effort is entirely volunteer. For a successful amateur service, in the public interest, the regulatory atmosphere must continue to permit freedom and flexibility ..."
Editorial QST Mar. '73

160 metres

"Stew (W1BB) reminds everyone of the importance of not forgetting the 'DX' window (1825-1830 KHz) when the band is open for DX working." (Rad. Comm. Mar '73 — Month on the Air)

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SPECIFICATIONS

The 'C' Series of miniature wirewound, vitreous enamelled resistors has been designed to meet the requirements of Specification BS 9114 - N002, and full Qualification Approval has been granted. A Test Report Summary is available on request; this report shows that many of the performance levels are in fact much higher than the specification acceptance levels.

The use of specially selected materials, combined with the application of exacting quality control throughout all stages of production ensures the consistent achievement of a very high standard of reliability.

ELECTRICAL SPECIFICATION

Tolerance: ±5% is standard on values of 1Ω and above and ±10% between 0.1Ω and 1.0Ω. For non standard values and tolerances please consult the factory.

Resistance values: C Series resistors are available with the preferred ohmic values of the E24 Series within the ranges shown in Table 1.

Temperature coefficient: Typically less than 100 ppm/°C and never exceeding 200 ppm/°C over the category temperature range −55°C to +200°C

MATERIALS

Core: High purity steatite ceramic. Chemically inert, capable of withstanding severe thermal shock and impervious to moisture. Ground to close tolerance finish to give maximum contact with wire element for rapid heat transfer.

Resistance Element: High quality nickel-chrome or nickel-copper alloy depending on resistance value; wound at minimum tension.

End Caps: Formed to close tolerances from a special nickel-iron alloy chosen for its consistent welding properties and glass sealing characteristics.

Leads: Solder coated nickel A.

Uncoated leads can be supplied for welding.

Specify – 'weldable leads'.

Preformed and cropped leads can also be supplied on request.

Coating: Humidity proof vitreous enamel with carefully controlled expansion matched to the materials of the resistor.

TABLE 1

C.G.S.				BS 9114 - N002							STYLE CROSS REFERENCE		
Style	Maximum wattage rating @ 20°C	Resistance Range Ω		BS 9114 - N002 Style	Maximum wattage rating @ 70°C	Approved Resistance Range Ω		Critical Resistance Ω	Limiting Element Voltage. Volts		DEF. 5111-1 Style	DEF 5115-2 Style	G.P.O. Style
		min.	max.			min.	max.		Normal	Low Air Pressure			
C3A	3	0.1	10K	2E-56-2.5	2.5	1	4.7K	3.9K	100	70	RWV3J	RFH3-2.5	P.O.35
C7	7	0.1	27K	2E-56-6	6	1	15K	6.8K	200	140	RWV4J	RFH3-6	P.O.40
C10	10	0.1	68K	2E-56-9	9	1	68K	27K	500	350	RWV4K	RFH3-9	P.O.36
C14	14	0.2	120K	2E-56-12	12	1	100K	47K	750	530	RWV4L	RFH3-12	–

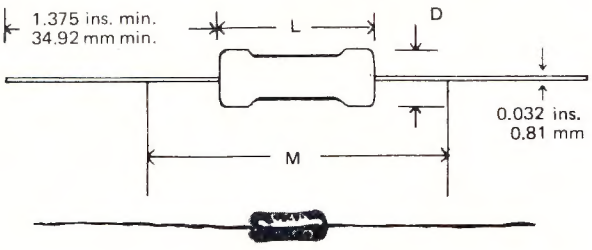

TABLE 2

Style	Length L		Diam. D		Measuring Distance M		Approx. Weight
	max. in.	max. mm.	max. in.	max. mm.	±0.062 in.	±1.59 mm.	grammes
C3A	.499	12.7	0.220	5.6	1.250	31.8	1.0
C7	.874	22.2	0.315	8.0	1.625	41.3	2.0
C10	1.499	38.1	0.315	8.0	2.250	57.2	3.5
C14	2.106	53.5	0.315	8.0	2.875	73.0	5.0

Note: M = resistance measuring points distance – below 10Ω only.

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1	339B-5	Novice Adaptor	100	136
1	PM-2	Power Supply for KWM2	140	220
1	75S-3C	Receiver	1,025	1,410

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2-08	⅝	8	3	No. 3006	**88c**
2-16	⅝	16	3	No. 3007	**88c**
3-08	¾	8	3	No. 3010	**$1.06**
3-16	¾	16	3	No. 3011	**$1.06**
4-08	1	8	3	No. 3014	**$1.19**
0-16	1	16	3	No. 3015	**$1.19**
5-08	1¼	8	4	No. 3018	**$1.32**
5-16	1¼	16	4	No. 3019	**$1.32**
8-10	2	10	4	No. 3907	**$1.91**

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References: A.R.R.L. Handbook, 1961;
"QST," March, 1959;
"Amateur Radio," Dec. 1959.

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Remote Control of the Yaesu FT-101 Transceiver

This article by G3AZT and reprinted with thanks from the English Arms's "Mobile News" of August and September 1972, provides a wealth of information on the problems (and their solutions) involved in fitting an effective HF mobile installation into a rather small car.

The author is firmly against a non-engineered installation of any sort within a vehicle. the use of hand held microphones together with radio equipment perched on the seat or jammed into some convenient space could bring mobile operation into strong disrepute, as well as endangering the personal safety of the operator and other people.

The number of cars in which an FT-101 can be installed in safety is indeed very small, so that the majority of mobile operators have to think about remote control if they are to operate in a safe manner. The FT-75 is a step in the right direction but this still tends to have the wrong dimensions for the average British small car, as well as suffering from severe power output limitations.

Having recently changed his car to a Triumph "Dolomite", the author found that it was impossible to install his FT-101 inside the car in a convenient position so the only solution was to put it in the boot and have remote control by means of a unit placed in the small glove compartment alongside the steering column.

The following functions are available from inside the car.

(a) **Tuning** — a range of 350 KHz swing at 9 MHz approx. is adequate for all bands giving a lower limit of 7,050 KHz on 40 metres and an upper limit of 21,400 KHz on 15 metres.

(b) **AF gain control** only has proved satisfactory — FT-101 gain is set to position 6 with R.F. gain fully up and with the noise blanker switched on. If overloading problems are encountered on 40 metres or another band then the attenuator must be left in, but this is rarely done.

(c) **P.T.T. switch** mounted on the control unit.

(d) Main D.C. power supply switch.

(e) **R.F. power output indication** — no "S" meter is provided since it gives little useful information when the FT-101 is used with the car in motion due to changing meter reading with battery voltage.

(f) **Loudspeaker output** — the speaker is mounted in the usual car radio position.

(g) **Microphone input** — the author uses a lightweight 50 K dynamic microphone attached to a stiff piece of p.v.c. insulated wire bent into a "U" shape and fitted around his neck.

The necessity for "boot" band changing and retuning is not considered a disadvantage — usually the aerial has to be changed anyway — and it overcomes the temptation to attempt complicated band switching and tuning whilst driving.

The various parts of the control system will now be described separately

They comprise:

1. Mounting of FT-101.
2. Cabling running from front to rear of car.
3. Line amplifier bolted to FT-101.
4. Control unit near driving column.

1. MOUNTING OF FT-101 IN BOOT

This is carried out by means of wooden brackets and supports. A 90° angle section of 1" x 1" soft wood strip holds the FT-101 along the top of the front panel by means of wooden supports attached to each end of it and bolted to convenient holes in the boot structure. Soft wood is preferred rather than metal in the interests of non-scratching and resilience. See Fig. 1.

The cables are terminated at the control unit by four Pin Jones plugs. Since the cables must be 50 amp rating it is difficult to connect them into the Jones plugs so that a two pole connection block is used to reduce the 50 amp wires down to ones of smaller cross-section so as to fit into the plug. See Fig. 2.

R.F. This is merely Uni radio 70 type cable run from the control unit to the line amplifier mounted on the side of the FT-101 and terminating in coaxial plugs at each end.

3. LINE AMPLIFIER

This is built into a small Eddystone die-cast box 4¼" x 2¼" x 1" deep. The circuit and layout

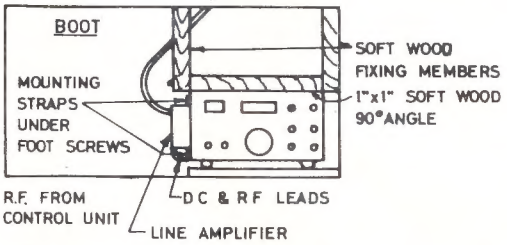


FIG 1 BOOT MOUNTING OF FT101

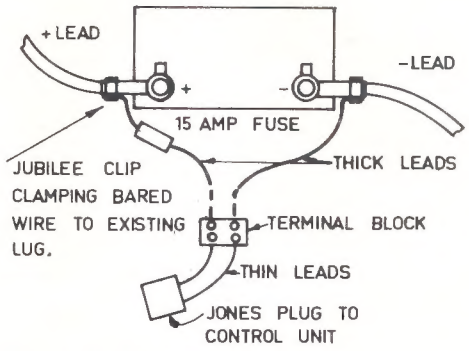


FIG 2 BATTERY CONNECTIONS

2. CABLE RUNS

Interconnecting Cables and Wires run under the carpeting and through bulk heads.

D.C. These are approximately 10-12 feet long. The main D.C. cables from the battery runs to the boot of the car via the control unit. One is attached to the negative terminal of the battery by means of a "Jubilee" clip around the lug and the other to a 15 Amp "Slydlok" fuse attached to the positive lug by similar means. See Fig. 2.

are shown in Fig. 4. The circuit is wired on an eight-way tag-board within the box, the input coaxial socket, gain control and lead grommet being positioned as shown.

The output of the amplifier is fed by means of a coaxial cable through the FT-101 C.W. jack socket together with the positive and negative power supply leads and soldered to the remote v.f.o. socket pins inside the FT-101. Fig. 5.

At the same time it is convenient to make the

REMOTE CONTROL OF THE YAESU FT-101 TRANSCEIVER

Continued from Page 7

additional internal connections at pins 2,3 and 7. The line amplifier is mounted firmly to the side of the FT-101 by removing the two rear feet as shown in sketch 1.

4. CONTROL CABLES

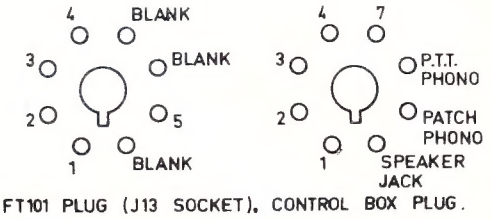
These consist of screened microphone cable with the screens bonded together at each end. The plugs are interconnected as shown in Fig. 3, except that the FT-101 plug pins are not connected at pins 5,6 and 8, the three remaining leads being connected to phono plugs. The leads are 10-12 feet in length and either taped together or enclosed in a length of plastic tubing before soldering into the actual plugs.

5. CONTROL UNIT

This is built into an Eddystone diecast box 7¼ x 4½ x 2 inches which is located in the glove box in foam rubber. Fig. no. 8 shows the main lay-out and details. It is necessary to space the Jackson drive and dial from the front of the box by means of aluminium or other strip material for a distance of one inch to accommodate the tuning capacitor. A plastic extension is provided on the PTT switch lever to facilitate change-over.

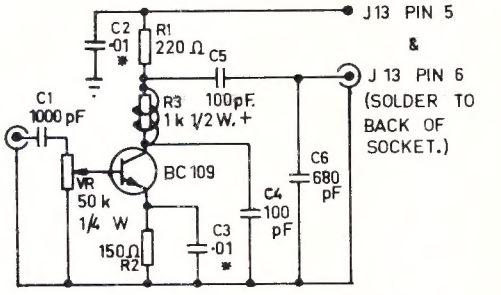
The circuit of the v.f.o. is shown in Sketch no. 6. The components are mounted on a ¼ inch thick insulation board by soldering to 8 BA screws attached to the board as shown in Fig. no. 7.

FIG. 3 — 8 Way Screened Cable Connections



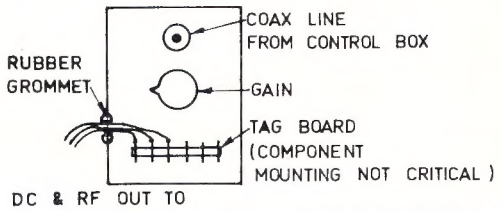
FT101 PLUG (J13 SOCKET), CONTROL BOX PLUG.

Numbers, etc., on above signify connection at opposite end of cable consisting of eight screened microphone leads sleeved or taped together, e.g. PIN 7 on FT-101 plug goes to PIN 5 on Control Box Plug.



+ 1k 1/2 W OVERWOUND 10 TURNS 18 SWG EN/L

* CERAMIC - OTHER CAPACITORS POLYESTER



DC & RF OUT TO BACK OF J13 THROUGH KEY JACK SOCKET OF FT101

EDDYSTONE DIECAST BOX 4¼"×2¼"×1"

FIG 4 CIRCUIT AND LAYOUT OF LINE AMPLIFIER

FIG. 5 — Additional Soldered Connections (Internal) to FT-101 Octal Socket J13

PIN CONNECT TO

2* Earth End of AF Gain on front panel.
3* Slider End of AF Gain on front panel.
5 +12 Volt Lead to Line Amp through key socket.
6** Coax R.F. output from Line Amp.
7 VR6 Slider (C37) — side of PA Compartment.
8 Earth to Line Amp through key socket.

* It is necessary to run both these leads in separate screened cables with outers earthed at pin 8 only.

** Earth outer at both ends, i.e. pin 8 and line amp case.

EQUIPMENT REVIEW

The Yaesu YD-844 Desk Microphone.

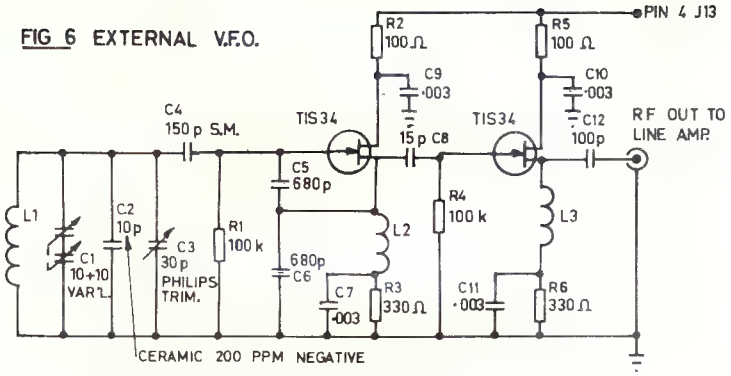
Often seen in advertising photographs of Yaesu equipment the YD-844 is a microphone of most elegant design. It is a high impedance dynamic type microphone and as such is suitable for connection to most current sideband transmitters and transceivers.

For the purpose of our test, the microphone was tested on air with various transceivers and also compared on a high fidelity tape recorder with a broadcast type dynamic microphone. On air reports all indicated very intelligible quality, while the output level was equal to two other test microphones. The biggest surprise occured when the Yaesu microphone was compared on tape with an STC 4037 — a broadcast type microphone. It was immediately noticed that the Yaesu had a very wide and smooth quality range and it could be confidently recommended for high fidelity public address work.

The push to talk switching was very smooth to use and could be actuated in two ways. As can be seen from the illustration there are two push buttons on the front of the base. One is a spring loaded PTT button while the second is a lock-on and release key. Then the PTT switch can be actuated by simply lifting the microphone from the desk.

The YD 844 is fitted with a five foot coiled lead and a normal tip, sheave and ring microphone plug.

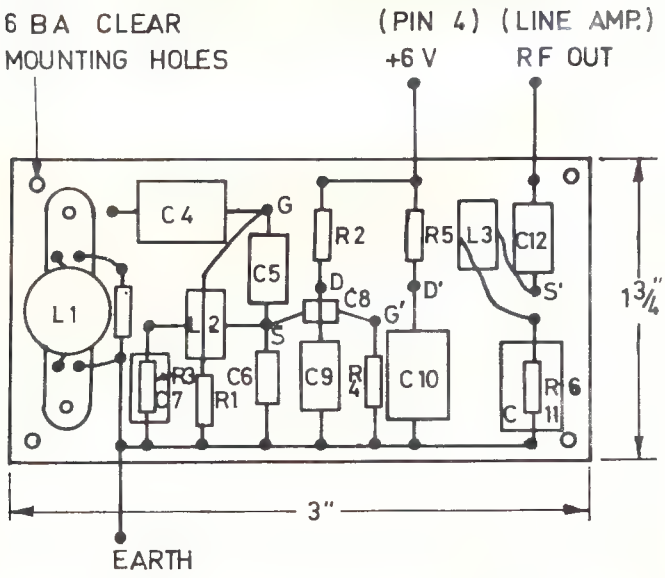
The Yaesu YD 844 microphone is priced at $39.50 and is obtainable from the Australian Agents, Bail Electronic Services from whom we obtained our test model.



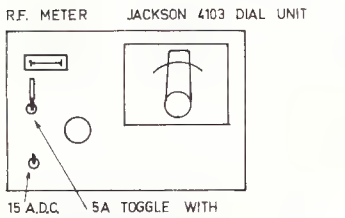
ALL CAPACITORS POLYESTER UNLESS OTHERWISE MARKED
L1 17 TURNS 7/16" DIA. FORMER 24 SWG ENAMEL
L2–L3 2·5mH. TELETRON R.F.C.

JAA

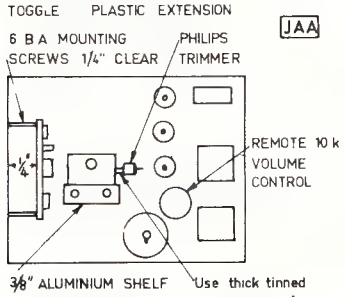
FIG 7 EXTERNAL V.F.O. LAY OUT



T.I.S. 34 FET'S not shown.
S,G,D, and S,' C,' D,' show connections.
Build on ¼" thick Insulation Board.
Components flush with board soldered to 8BA screws bolted through board.



JAA


6 B A MOUNTING SCREWS 1/4" CLEAR
PHILIPS TRIMMER
REMOTE 10 k VOLUME CONTROL
3/8" ALUMINIUM SHELF
Screw to front of box and back of lid with 4 BA screws.
Use thick tinned copper wire for connections to tuning capacitor.

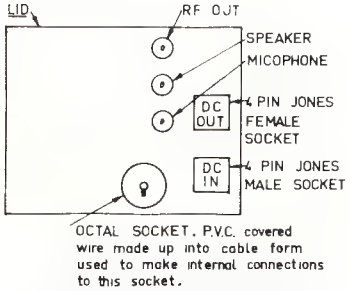

LID
RF OUT
SPEAKER
MICOPHONE
DC OUT
4 PIN JONES FEMALE SOCKET
DC IN
4 PIN JONES MALE SOCKET
OCTAL SOCKET. P.V.C. covered wire made up into cable form used to make internal connections to this socket.

FIG 8 CONTROL BOX LAYOUT – BUILT IN EDDYSTONE BOX 7¼"x4½"x2".

TESTING

It is suggested that the Control Unit is tested on the bench first, using short connecting leads. The v.f.o. range can be adjusted by comparing it with the internal v.f.o. of the transceiver simply by switching over from internal to external v.f.o. Adjustment of C3 and possible L1 will enable the requisite frequency range to be obtained.

The Line Amplifier gain control can be set to give slightly more R.F. output and possible greater sensitivity on receive than with the internal v.f.o. In the writer's case, ¼ S-point on receive. The VR6 slider (on the rear of the FT-101) should be set to give adequate R.F. indication on the 250uA R.F. power output meter on the control unit. Finally, coil turns should be set in place with Durofix.

OPERATION

The unit has been in constant daily use for several months. Stability is excellent and the inside of the car does not look like a radio shack! The addition of attenuation, noise blanker and R.F. control was considered but rejected on the basis of complete operator satisfaction.

In good weather operation from a seat outside the car using the noise cancelling microphone in the normal socket and internal speaker with the boot lid open gives great satisfaction. Finally, the FT-101 can quickly restore to its original state — in about ten minutes — before possible resale.

AR

MEMBERSHIP SUBSCRIPTIONS

The response to timely payment of subscriptions has been quite encouraging this year even though many paid against "Final Notices". Apologies are due to a number of members with names beginning with A. A short trial run was done to line up the print out on the subscriptions form and due to problems with splitting the pages of printed notices some Final Notices which had been duplicated in the trial run slipped through undetected.

SWEDISH AMATEUR LICENSING

From the PMG's Radio Branch comes a copy of new and amended rules for amateurs in Sweden. They refer to both long-term and temporary visitors to Sweden requiring Swedish licences and, regardless of any reciprocity agreements in existence or to be negotiated in the future, each application is given similar consideration as applies to their own residents requiring a licence. The moral seems to be that if you want a licence when visiting Sweden you must apply well in advance.

LA BALSA

Syd Molen VK2SG, writes that Vital Alsar will sail three rafts with 12 people aboard across the Pacific leaving on 24th May and arriving Mooloolabah (Qld) some time in October. Communications on amateur bands as for La Balsa. Request is made for clear frequencies, except for those assisting, although a listening watch would be of great help. For "La Balsa" details please see A.R. January 1971.

STANDARDS ASSOCIATION

A new Australian standard has been issued for fixed capacitors for direct current paper or paper/plastic film dielectric with rated voltages up to 6300V. The standard is No. 1381.

EXCHANGE RATES

Ever calculated how much the Australian dollar is worth in terms of overseas currencies? Recent rates were $1A equalled US.$1.41 (1.19), 1.76 pounds (2.06), DM 4.07 (3.77). Figures in brackets were those prevailing some eight or nine months ago.

WPX

What is this "WPX"? In simple terms it means collecting QSL's from as many different prefixes as possible. The "CQ Magazine" for February 1973 lists VK3AHQ as confirmed 809 on CW in conformity with the CQ Master Prefix List. However he is the only VK listed. Tops is a W with 1197 prefixes in the Mixed Section.

An A.R. Special

THE 1973 FEDERAL CONVENTION

As with every similar Convention in recent years the Agenda items generated more discussion than could reasonably be accommodated from Friday to Monday morning. Working Parties at night attended to those subjects which could be classified as capable of generating volumes of steam.

Justice cannot be done to the Convention business as a whole in a short article of this nature so a resume of the more important items only can be attempted. Also it will be appreciated that there is difficulty in selecting the reader's favourite topic in amateur radio out of the wealth of discussions. Whatever may be your interests, however, you can rest assured that almost everything of current topicality received a good airing.

Two questions which took up considerable time were finances and repeaters. Finances were particularly selected for examination because of a qualified report by the Auditor.

With costs rising all round us how could the Institute be kept going without subscription increases? But the unpalatable facts of life had to be faced, so said the Chairman of that particular Working Party, when presenting the 1974 budget with a recommendation that the central administration's share of the Full and Associate Members' subscriptions for 1974 be increased to $7.20 instead of $6.19 applicable in 1973. This covers the costs of Amateur Radio, I.A.R.U. levy and the very small Executive office which includes centralised membership and subscriptions processing through EDP, salaries, wages and the normal unavoidable expenses in running any central office. The recommendations were accepted. It was accepted that the Executive office was grossly overloaded with work and various measures were suggested to rectify this unsatisfactory state of affairs.

The main details of the outcome of the repeater deliberations were published on page 2 of May A.R# These derived from a working party composed of every Federal Councillor.

A matter of considerable importance to future Institute activities was surprisingly finalised with little delay. This was the so-called "Novice Licensing" for which the Controller's letter arrived only a day or two prior to the Convention. This important letter was published in full on page 7 of May A.R. The Convention directed the Executive to accept the P.M.G. Department proposals subject to putting forward four additional points, namely an extra frequency allocation 28.100 to 28.300 MHz, a special "N" Series of call signs, Limited Licensees be permitted to hold both a "Z" and an "N" call if so qualified and that stations be inspected at the time of licence issuance so that the holder could be told of his responsibilities, etc. Some doubt exists about the success of the 10 metre proposal but the next two proposals appear to have been accepted favourably by the Controller.

Efforts were made to allow long-serving Federal Councillors a eagerly awaited Easter with their families, and simultaneously to explore the feasibility of more frequent Conventions on different dates with increased intercommunications possibly at less cost than one highly formal Convention per year. After much discussion no satisfactory alternative to the present arrangements could be discovered except that matters of interest to two or more Divisions should be discussed, and if possible, agreed in advance of any postal voting. The last mentioned also alluded to the use during 1973 of the notorious Article 44 of the Constitution.

VK2 Division put forward the desire of the Canberra Radio Society, upon incorporation, to form the A.C.T. Division of the Institute. A motion was passed agreeing to this admission after fulfilling the requirements of Article 3 of the Constitution.

The new post of a Federal WICEN Publicity and Liaison Officer acting through Divisional Councils was approved as also a new Section for RTTY on lines similar to the Key Section.

Several mechanical motions dealing with specific aspects of the Publications Committee work were passed which will mean the active participation of Divisions (other than VK3) in "Magpubs" and Call Book activities.

On contests the VK5 Division are to prepare a standard set of Contest Rules in respect of interstate contacts in Divisional contests which happen to be held on simultaneous dates. In the R.D. Contest the proposal to include a club stations' score in the Divisional total was passed to the Federal Contest Manager for necessary action although it could be too late to incorporate this in the 1973 R.D. Contest rules.

A motion to approach the PMG Department to liberalise the issue of licences to older persons with past services experience in radar (etc) was lost on an equality of voting. In relation to approaches to the Department the Report of the Executive high-lighted the continued excellent relations existing between the Institute and the Radio Branch. However, attempts to secure a change-over to a multi-choice type of examination by the Department were reported as unlikely to achieve success in the foreseeable future on administrative and financial grounds. Similarly unsuccessful were attempts to obtain the use of the AX prefix which the Department has reserved for use only on occasions of special national importance. Successes in 1973 however, included a considerable liberalisation in reciprocal licensing concessions (see page 17 of Aug '73 AR). The President reported, with statistics, that membership in the Institute of licensed amateurs was disappointing although associates showed a reasonable numerical increase.

Of the other Annual Reports all were received and all but one were adopted. A vote of thanks was iessee o the writers of the Reports and to the VK3 Division for having the Convention in Melbourne at very short notice.

Finally the appointment of new officers of the Executive were Dr. D. W. Wardlaw VK3ADW, as Federal President, Mr. W. E. J. Roper VK3ARZ as Editor and Messrs. D. H. V. Rankin VK3QV, K. V. Roget VK3YQ, J. J. Martin VK3TY and K. Connelly VK3ARD as members of the Executive.

R.D. CONTEST IS NEAR

Will your log be in to join the 700 wanted?

Magazine Index

With Syd Clark, VK3ASC

RADIO COMMUNICATION. February 1973.
The G2DAF SSB Transmitter Mk.3.; TT. Multi-band Loops, FET Regulator, High current Pwr. Sup. etc.;
RADIO COMMUNICATION. March 1973.
The G2DAF SSB Tx. (Pt.2).; Bilateral SSB.; Improved Harmonic Attenuation in HF Amateur Transmitters.; TT; Double Balanced FET Mixers, Setting NBFM Deviation, Crystal NBFM Discriminator, Transistor Car Regulator, Ergonomics and others.
SHORT WAVE MAGAZINE. February 1973.
Solid State Receiver for 2 Metres.; Adaptable 30 watt Transmitter.; R.A.S. Question answered.
CQ. February 1973.
A Simple, Effective VFO for the Novice Operator.; The Three-Quarter Wave, Current Fed Antenna.; An RTTY Repeater.; Leader LDM-810 Reviewed.; CQ WW WPX SSB Contest.;
CQ. March 1973.
The Loop Box.; Teletype Test Generator.; CW, The Second Time Around.; Zener Diode Cathode Bias.; Modifying the Allied-Radio Shack Series 190 Receivers.; Simple R.F. Output Metering.; The Song of the Flea (40 countries in a month with 3 watts.).; Protective Circuits for Transistor Power Supplies.; An RTTY Repeater.;
HAM RADIO. February 1973.
Designing Communications Receivers for Good Strong-Signal Performance.; Integrated Circuit Speech Clipper.; VHF Receiver Scanner.; How to Use the Plessey SL600 Series I.C's in Amateur Communications Equipment.; Solid State Noise Blanker.; A Simple Receiver-Demodulator for RTTY Net Operation.; Grid Current Meter for HW-100 & 101 Integrated-Circuit Audio Oscillator. (15 Hz-40 KHz);
QST. March 1973.
The W2FMI Ground Mounted Short Vertical.; An Inexpensive Time-Domain Reflectometer Tips on Ten.; A Solid State SSTV Monitor Mark II.; An SSB Receiver for 7 & 14 MHz. A Contest Spotting Switch for the 32S-3.; Simple and Efficient Feed for Parabolic Antennas.; Solution to Fuel Injection System Interference.; A Universal Voltage-Multiplier Circuit.; Review:- ETO Alpha 77 Linear Power Amplifier.; Standard SR-C146 FM Transceiver.; DANGER: When you Transmit You Can Turn Off a Pacemaker.; Why Mus' We Moider Da King's English?;

MAGAZINE SUBSCRIPTIONS

Direct from Publishers

The list published on page 18 of April A.R. is still current except for subscriptions to VHF Communications. The new rates for this appear elsewhere in this issue
Prices of overseas magazine subscriptions are being held at present levels until the exchange rates situation clarifies
Because of mail delays and other circumstances beyond our control there has existed considerable time between ordering time between ordering an overseas magazine and actually receiving the first issue. All evidence points to a return to normality from last month - i.e. a "normal" delay of around 6 to 8 weeks

W.I.A. MAGPUBS
P O. Box 150, Toorak, Vic., 3142.

AMATEUR RTTY IN AUSTRALIA

DR. KEN KELLY *VK4MJ

For some years a small band of enthusiasts have been using the RTTY mode in Australia, but many of the Ham fraternity have little or no idea of the ins and outs of this fascinating facet of our hobby. However in the past three or four years there has been an increasing interest, and I have found that there are quite a number who have some interest, but feel that the complexity of the project may be too great. Fortunately, this is a misconception, and I will hope to show that most of the difficulties can be overcome fairly easily, and that you may enter a new world in this mode. I found that the transition to RTTY from SSB was just as rewarding and fascinating as was the earlier transition from AM to SSB.

DX galore

Most of the contacts at the present time will be with DX stations, as the number of active stations in VK at any one time is very few. There are of course the usual number of Stateside stations, but it is also easy to work many in the Oceania area, and Europeans galore. In fact you name it, and it can be worked. Further, the signals do not need to be S9 – with demodulators of modern design, the machine will print copy which is way down in the noise and barely audible. Many times I have been able to print signals which I would not have been able to copy as CW!

Local nets

As the interest grows, the possibility of forming VHF nets in an area is beginning to take shape. With transistorised VHF receivers, it is quite practicable to leave the receiver running, and a very simple system to be described in a later article will turn the printer on when the mark tone is received, so that a message may be printed at an unattended station, all ready to read when the operator comes home from work — or beach. A little more complex, but not unduly so is a similar system for use on HF bands.

RTTY QRM

Many RTTY stations can be heard on the HF bands, and on many occasions I have heard operators complain that Ham RTTY is a menace. This is not so. Most Ham RTTY is confined to a very small part of the band. Frequencies used are 14.075-14.100, 21.075-21.100, 28.075-28.100. In actual fact most of the 14 MHz traffic is between 14.090 and 14.100, and it is rare to hear of anyone on the other frequencies except during a contest. On the lower bands there is no regular traffic, but 3540, 7010 and 7040 are most commonly used. All the other stations you hear on the bands are commercial pirates!

Getting started

First of all, do not be discouraged because you can't type. This will come with a little practice. The great thing to realise is that it is unlike CW where the unfortunate recipient of a painfully slow operator has to sit and wait for each letter and write it down. If I make contact with a slow operator on RTTY I can do some other little job round the shack, or even go and get a snack. The thing will keep printing while you are away. You can hear when he stops, rapidly read the two or so lines he has laboriously sent, and go ahead with your reply. Most of the stations I have worked who have new and slow operators have been found to make remarkable progress within a very few weeks.

The basic theory of RTTY is covered in the ARRL and RSGB handbooks. There are also two American publications with more detail available at the bookshops – "RTTY, A to Z", and the new "RTTY Handbook". In addition the "RTTY Journal", published almost monthly, contains many items of interest, including technical and news features. Write to Box 837, Royal Oak, Michigan 48068, U.S.A. The subscription is U.S. $3.50 (airmail US $5.50).

The main problem is getting started is to obtain a machine. They are not plentiful in Australia, but they can be obtained from time to time if you keep watching the ads in "AR", and also the sales from the various Government instrumentalities. From time to time the WIA in some states has been able to obtain a few, and there is a strong possibility that some will become available in the next few months. It is best — in fact almost essential to obtain a page printer, although a tape printer can be used, but is rather inconvenient to use for ordinary QSO'S# The two types most likely to be obtained are the Creed Model 7, and the Teletype Model 15. Either of these should be satisfactory if in reasonable order.

Receiving RTTY

Receiving RTTY signals is dependent on a stable receiver. It is essential that the drift be of a low order, and the oscillator of the receiver must be stable and not subject to fluctuations. Remember that you will have to maintain tuning within a few cycles. With the type of SSB receiver found these days in most stations, this should be no great problem.

You will then need to build a demodulator for the RTTY signals. This equipment is also commonly known as a terminal unit or "T.U". You will find some simple ones described in Handbooks. The most popular one in use at the present time is the "ST-6" or some modification of it, which has been described in "Ham Radio" magazine (January 1971).

I will later describe a method whereby this unit may be made in convenient sections, using circuit boards designed for maximum flexibility, so that you may experiment with modifications to various sections of the circuit without having to scrap any of the unit in the process. It is a completely solid state device, and gives a high standard of performance. Templates of the circuit boards will also be published, making duplication a very simple matter.

Sending RTTY

There are several ways in which the carrier shift necessary for sending RTTY may be obtained. Note that the transmitter is in effect transmitting a constant carrier so that it must not be loaded to the input used for CW. It should be loaded as if for AM transmission to ensure that the dissipation of the final tubes is not exceeded.

The simplest method is to make an audio oscillator, which can be fed into the microphone jack of an ordinary SSB transmitter. This will produce a carrier, and alteration of the frequency of the oscillator will of course shift the carrier by the same amount. Such an oscillator may also be made on a circuit board, and incorporated in with the terminal unit. However, with this method — "A.F.S.K." it is essential that the SSB filter has a rejection of at least 50 dB.

Other methods of frequency shift mostly depend on some method of altering the VFO tuning by a small amount, usually with a varicap, or a small capacitor in conjunction with a switching diode. Usually this can be done with a very minimal modification to the station transmitter — the installation of a suitable connector, three small components, and one wire to the VFO.

In the next article a simple T.U. will be described, suitable for copying on VHF, and also useful on HF when conditions are good. From this basic unit, various additions will be described up to a final sophisticated unit.

Interested?

If you are interested, the writer will be happy to give you further information, or to put you in touch with your nearest active RTTYer, who will be delighted to have the opportunity of demonstrating his equipment and trying to make another convert.

*285 Monaco St., Surfers Paradise, Qld 4217

South East Radio Group of S.A.

ANNUAL CONVENTION

will be held over the weekend

SATURDAY and SUNDAY June 9 and 10, 1973

Events will include HF and VHF scrambles HF and VHF fox hunts, hidden transmitter hunts plus other events.
Hotel and Motel accommodation can be arranged if it is required with a $6 deposit.
Registration Fee per Amateur $5 (includes family). All correspondence to S.E.R.G., Box 1103, Mt. Gambier, 5290.

700 LOGS WANTED FOR R.D. CONTEST — AUG. 1973

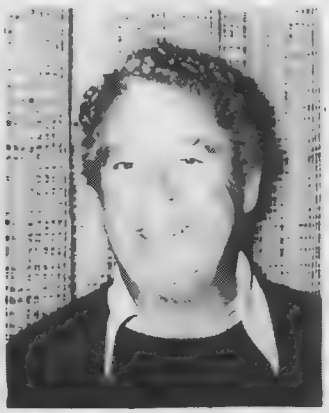
EASTER FEDERAL CONVENTION 1973 —"CANDID SHOTS"

KINDLY SUPPLIED BY CYRIL MAUDE VK3ZCK

L to R. David Rankin VK3QV, Mr. Horrie Young (Controller, Regulatory and Licensing of PMG Radio Branch), Ian McKenzie VK2ZIM, Tony Mulcahy VK2ACV (VKZ President and the F.C.)

Part of Members at Conference Table.

Bill Roper VK3ARZ
Editor — A.R.



Ted Cruise VK7EJ
(VK7FC)

Neil Penfold
VK6NE

Russell Kelly
VK3NT

In this photograph, are Laurie Blagbrough VK4ZGL (VK4FC) and Surg. Capt. Jim Lloyd VK3CDR (VK3FC).

L to R. Tony Mulcahy, Geoff Taylor VK5TY (VK5FRES & FC), David Rankin, Mr. Young, Ian McKenzie, Ted Cruise.

BELCOM LINER 2 Solid State 144 MHz SSB transceiver, 10 W PEP, 12V DC VXO coverage 144.100 to 144.330 KHz, can be modified to any other part of the 2 Meter band with additional mixing crystals, complete with microphone and mobile bracket, incorporates many facilities as noise blanker, clarifier on reception, squelch, size 9"x3"x10" contains 27 transistors, 6FET's, 1 I.C. and 44 diodes, all for $350

SWAN TV-2C 2 Meter transvertor, 14 MHz input, 240 W PEP output on SSB, receiver noise figure less than 3 db with two FET rf stages and FET mixer, 5894-B transmitter output stage, to be powered externally from the supply of the driver-transceiver $450

SWAN VHF-150 2 Meter linear amplifier, 150 W input with only 2 Watt drive power, built-in AC supply, with input-output relays to by-pass linear on reception, optional Class C for FM & CW or Class B operation for SSB, uses an RCA twin-tetrode 5894-B $375

KEN PRODUCTS KP-202 2 Meter FM 2 Watt output hand-held transceivers, with provisions for 6 channels, crystals for 4 channels provided, 144.48 & 144.60 plus a choice of channels A, B, Repeaters 1 or 4 ..... $150
Extra crystals $8 per channel for 2 crystals.

BARLOW WADLEY XCR-30 Mark II a truly portable crystal controlled communications receiver, using the Wadley loop principle as applied in the RACAL & DELTAHET receivers, perfect for AM, CW USB/LSB SSB reception, continuous coverage from 500 KHz to 31 MHz, measured drift of only 50 cycles in half an hour from cold on!, all for only $225

GALAXY RF-550-A In-line power output meter, 0-400 & 0-4000(!) Watt forward & reverse, calibrated and OK for all frequencies from 2 to 30 MHz, with built-in 6-position coax switch, unused portions shorted to ground $75

SWAN VM-1500 In-line power output meter, forward & reverse power 2 to 30 MHz, 4 ranges 0-5, 0-50, 0-500 & 0-1500 Watt rf power, 10% calibration accuracy $50

OMEGA T Antenna noise bridges, 0-100 MHz, indispensable for intelligent antenna work, still only $25

YAESU-MUSEN SSB tranceivers FT 200/FP 200 combination only $435
FT 101 ..... $660
FT DX 560 ..... $525

HY-GAIN ANTENNAS 14 AVQ vertical $45
TH 3 JR tri-band junion beam $100
HY-Quad, tri-band full-size cubical quad $130

ANTENNA ROTATORS CDR AR 22 R $40
Heavy Dury Ham-M $130
Medium-duty model for smaller beams, AIGA ART-3000 ..... $75
The latter two models have mechanical brakes, holding beams in position when rotator not energized. All for 230 V AC, complete with control-indicator units.

MIDLAND PRODUCTS One Watt walkie-talkies 27-28 MHz each $40
27 & 28 MHz sets of crystals, 27,065 to 28,500 KHz $3 per pair
SWR meters, 52 Ohm impedance, single-meter type $10 double meter type, reads forward and reflected power simultaneously, now only $16

SPECIALS Collins 618-T SSB/AM 400 W PEP transceiver, 28,000 channel 2 to 30 MHz, auto-tune with automatic antenna match box, ideal for combined marine or airborne & amateur operation, 27V DC, completely overhauled, used but perfect, frequency-synthesized operation and accuracy better than one per million, at less than 8% of the new cost $1,500

HARDWARE, 20 Meter traps, boom to mast & boom to element brackets for 20/40 Meter beam construction, apply for details.

Essential components for a **SUPER LINEAR**, B & W 850-A 10-80 Meter switched plate coil, 0-500 pF vacuum variable capacitor, 4 CX 1000-A Eimac ceramic with Eimac base & spare tube(!), squirrel cage blower fan, the lot for $350, sorry, no individual parts sale!

All prices net, cash with orders basis Springwood, S.T. included in all cases, subject to changes without prior notice, freight, postage & insurance charges are extras!

SIDEBAND ELECTRONICS ENGINEERING

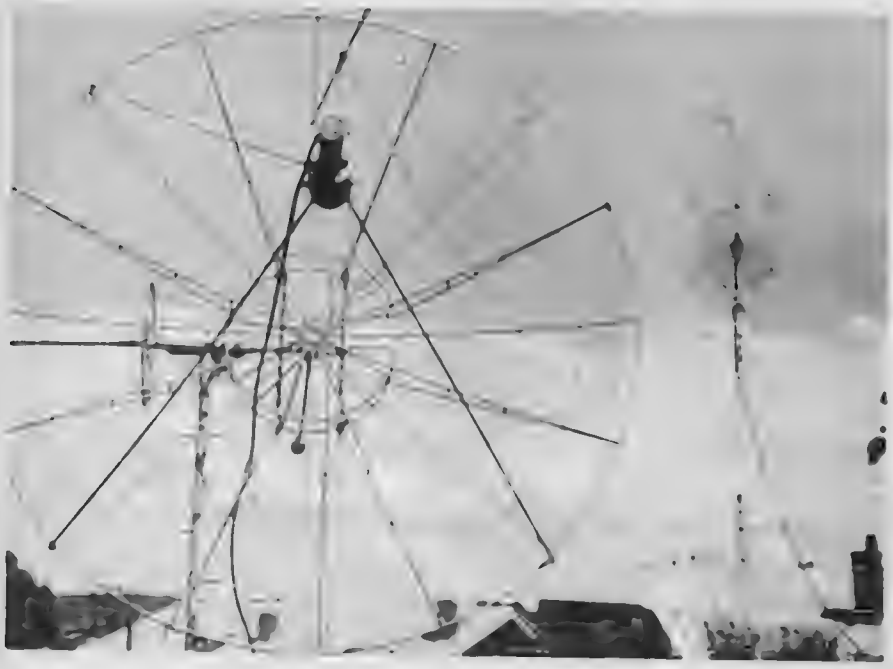
proprietor-janitor-accountant, financier & no agents — Arie Bles

P.O. Box 23, SPRINGWOOD, Phone Springwood, new number as it was in 1972,

(STD 047) 511394

Private address 78 Chapman Parade on the dirt track to Norman Lindsay Gallery, Faulconbridge.

The three photographs depicted here of Ron Wilkinson, VK3AKC, and his gear were kindly supplied by the PMG's Department, Engineering Division. And we are indebted to them for permission to publish. For details of the 1296 MHz moonbounce success please refer to page 15 in A.R. of April 1973. It is gratifying to observe that pictures and stories of Ron's achievements appeared in the Australian Post Office News (Apr. 1973) and in the VK3 press.



WICEN

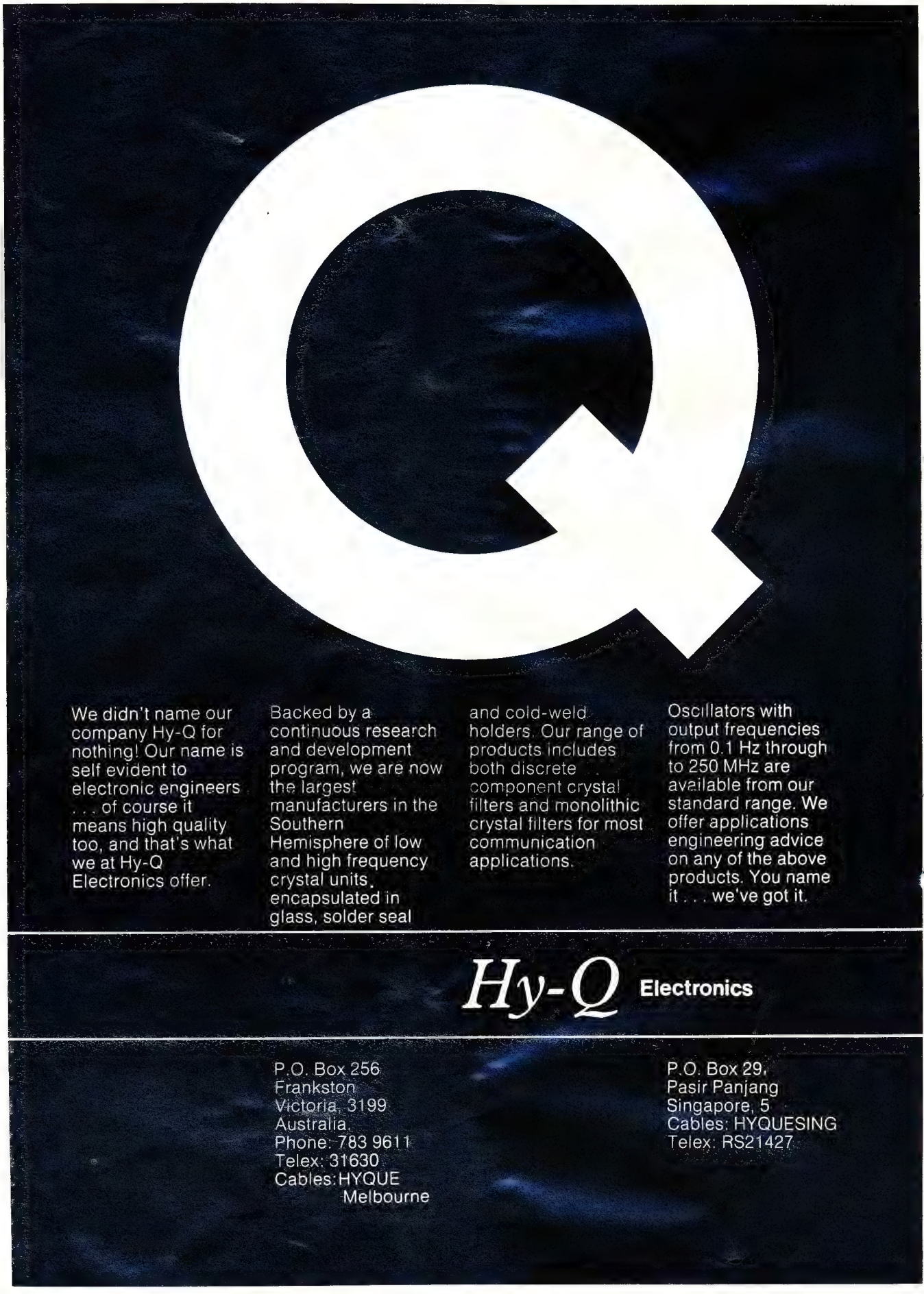
Pictured below are some photographs taken during the WICEN exercise between the VK3 Division and Red Cross for the Murray River canoe races over the last New Year holidays. Photographs by courtesy of Bob Broughton, VK3ZKO/T.

Operations at Picnic Point.

Shady comfort.

The Organiser, John Battrick, VK3OR, in a pensive mood — no doubt plotting permutations.

Peter Mill, VK3ZPP, operating 2 Mx from Yarrawonga Football Ground.


We didn't name our company Hy-Q for nothing! Our name is self evident to electronic engineers . . . of course it means high quality too, and that's what we at Hy-Q Electronics offer.
Backed by a continuous research and development program, we are now the largest manufacturers in the Southern Hemisphere of low and high frequency crystal units, encapsulated in glass, solder seal and cold-weld holders. Our range of products includes both discrete component crystal filters and monolithic crystal filters for most communication applications.
Oscillators with output frequencies from 0.1 Hz through to 250 MHz are available from our standard range. We offer applications engineering advice on any of the above products. You name it . . . we've got it.
Hy-Q Electronics
P.O. Box 256
Frankston
Victoria, 3199
Australia.
Phone: 783 9611
Telex: 31630
Cables: HYQUE
Melbourne
P.O. Box 29,
Pasir Panjang
Singapore, 5
Cables: HYQUESING
Telex: RS21427

VHF UHF

an expanding world

With Eric Jamieson,* VK5LP

Closing date for copy: 30th of month.
Times: E.A.S.T.

AMATEUR BAND BEACONS

VKO	52.160	VK0WI Macquarie Island
	53.100	VK0MA Mawson
VK2	52.450	VK2WI Dural
VK3	144.700	VK3RTG Vermont
	144.925	VK3QZ Traralgon
VK4	52.600	VK4WI/2 Townsville
	144.400	VK4WI/1 Mt. Mowbullan
VK5	53.000	VK5VF Mt. Lofty
	144.800	VK5VF Mt. Lofty
VK6	52.006	VK6VF (VK6RTV) Bickley
	52.900	VK6TS Carnarvon
	144.500	VK6RTW Albany
	145.000	VK6VF (VK6RTV) Bickley
VK7	144.900	VK7VF (VK7RTX) Devonport
VK8	52.200	VK8VF Darwin

Note: Call signs in brackets indicated new call sign when change made.

Beacons listings this month are down to the winter listings — those of our own Continent. Other areas will be re-included when conditions are likely to be more suitable for their reception.

CANBERRA NEWS

Pleased to receive a letter from Andrew VK1DA with some information of what transpires in that area. He reports the VK1 beacon still works well in Eddie VK1VP's establishment, and still awaiting the P.M.G. licence! Let us all hope it can be heard next DX season. (Dec.)

Four VK1's are working through Oscar, VK1ZT, VP, MP and DA. They find some problems with interference between stations working Oscar and Channel B users, in that SSB and CW signals are rather disturbing to hear in an FM receiver!

Interesting to note Neil VK1ZT copied W2NFA during Ron VK3AKC's 1296 MHz EME contact, verifying the 339 report being sent to Ron.

Currently a renewal of interest covering the path between Sydney and Canberra, Mike VK2AM being the probable instigator, and stirring up Roger VK2ZRH and Rod VK2ZQJ, so, coupled with the Geelong Club appeal for a "Get back to Two" campaign, anything might happen, particularly since Reg VK1MP has heard VK2ZAY in Boggabri, a path distance of about 340 miles.

Finally, Andrew reports that Neil VK1ZT and Ron VK3AKC tried to work each other on 1296 MHz from Mt. Ginini near Canberra to Geelong, during the National Field Day weekend. Neil heard good radar pulses from Tullamarine Airport but nothing of Ron. Still, there may be better results on the next try. Good luck chaps.

NORTH WESTERN NEWS

Thanks also to Peter VK6ZDY for taking the trouble to write to me of happenings in the Port Hedland area of W.A. Peter was transferred in his job last February and expects to spend 12 months there. His equipment consists of an FT200, FTV650 transverter, 5 element yagi at 15 feet. First signals from Japan were heard on 4th March, but variable in signal strength. All districts worked, including JH1IGC who runs A3J into four bays of five element yagis stacked at 70 feet!! Peter makes the comment ... "he's very strong!"

The JA's have been working the northern regions of VK and hearing the beacons VK8VF and VK6TS. Ken VK6ZFQ is 125 miles south east of Port Hedland at Dampier and is working plenty of northern DX. The JA's have been consistently working DU1, DU9, and KG6 around 50.1 MHz. So it seems we southerners must move northwards if we are to work the exotic material which appears to be available.

JA'S WORK INTO VK5

A brief report from Bob VK5ZDX mentions that Bob VK5PB worked three JA3's around 2000 hours on 24th April, signals S5-7. Well, you have got to be there to work them, and I wasn't!

OTHER NEWS

The April issue of "6 UP" continues the series of interesting articles on meteor scatter propagation by Rod VK2ZQJ, all making very good reading; when I finish my latest course of study (in 2 years time!) I might be tempted to go into this form of operation. In the meantime, the following date from "6UP" of Enhanced Meteor Shower Activity for the Southern Hemisphere could be of interest: June 8, 9, 10, 11, 12, 23, 24. July 26, 27, 28, 29, 30, 31. August 1. September nil. October 20, 21, 22. November nil. December 4, 5, 6, 12, 13, 14. These are from the International Geophysical Calendar 1973.

From the pages of "Q.R.M." comes the hint given by Joe VK7ZGJ that the best thing yet for protecting the copper side of printed circuits is hair spray! Apparently it is easier to solder through and gives good protection.

Note the "Get Back to Two" campaign has been supported by the Maitland Radio Club. Following on my opening remarks on this campaign last month, why not be in it and send the Geelong Amateur Radio and T.V. Club information regarding your stations. Briefly they want to know: Name — first and surname, address, call sign, phone number and STD area. Details of your 144 MHz station, e.g. VFO or crystal, power, mode, usual freq. antenna, best direction for beaming, what times are you available? Also they ask: Can you operate on 144.05, 52.05, 7090 and 14120? What beacons, repeaters or TV stations do you monitor? Any other info. Get the answers away immediately and you may be in time to be included in the results to be published in their Newsletter shortly. Postal address for information: P.O. Box 520, Geelong, Victoria, 3220.

TOWNSVILLE NEWS

Ron VK4ZLC writes from Townsville to say there have been plenty of JA openings on six metres so far, most call areas being worked, Ross VK4RO, Ron VK4ZTK and himself being the main operators. 146 MHz is gaining in popularity.

Ron also advises that the Townsville Amateur Radio Club is organising a North Queensland Convention to be held in Townsville during the weekend of 21st and 22nd July. Registration date is 30th June, and enquiries directed to Secretary of the Club at P.O. Box 964, Townsville, 4810. The programme caters for everyone and prizes are being arranged. Briefly the format is: Sat. a.m. Technical session, p.m. Foxhunts and scrambles, evening: Social evening, Sunday a.m. Family picnic, followed by lunch in the form of a barbeque.

BAND USAGE QUESTIONAIRE

I would hope that by the time this is read all copies of the Band Usage Questionaire provided by the VHF/UHF Advisory Committee would have been returned completed. If you are a VHF/UHF operator who has not taken the trouble to complete same, why not do it now, and post it right away to the address stated. It is a very important document and so necessary if the work of the Advisory Committee is to be guided along the lines most sought after by those using the VHF/UHF bands. Go to it.

The South East Radio Group Convention is to be held over the holiday weekend of June (9 & 10) at Mt. Gambier, and this page wishes the organisers a successful venture. These annual functions have provided an excellent means for amateurs and their families to meet and get to know one another, as well as to look around the country during the fox and hidden transmitter hunts! Why not go along yourself?

News is somewhat scarce this month, and the small print at present in use makes the information look even less. However, things might brighten up a bit for next month. In the meantime here is the thought for the month: "We have too many people who live without working, and we have altogether too many who work without living." 73.

— The Voice in the Hills.

MICROWAVE DEVELOPMENTS

Encouraged by the results of a 28 mile contact on 3.9.72, the old firm of VK2BDN and VK2ZAC have just completed a six month rebuild of their 2304 MHz equipment which was directed towards higher RF power output and improved portability

A successful trial was conducted on Tuesday, 24.4.73 over a path of 53.5 statute miles with VK2BDN located at North Head near Manly and VK2ZAC at Kings Tableland near Wentworth Falls. Elevations of the respective sites were 250 and 2898 feet above sea level and the path was near optical. Weather conditions were mild and overcast with a light NE breeze, and the contact was maintained for one hour.

Signal Reports

VK2BDN reported VK2ZAC's signals as readability 5 and strength 9 plus. VK2ZAC reported VK2BDN's signals also as 5 and 9 plus, and created a sensation by removing the four foot paraboloid aerial and substituting a 1¼ inch ground plane which still resulted in a signal report of 5 and 6.

Equipment ... VK2BDN

Transmitter — Solid State 144 MHz exciter, solid state power amplifier running 28 watts input at 144 MHz, varactor doubler chain to 2304 MHz. Estimated power output 2 watts. Modulation NBFM. Feedline 5 feet 50 ohm coax cable. Antenna, 4 foot dish with dipole feed. Receiver, crystal controlled converter, 1N21D mixer, 144 MHz first IF to a mobile communications receiver.

VK2ZAC

Transmitter — 144 MHz exciter using tubes, power amplifier QQEO3/20 with 28 watts input, varactor doubler chain to 2304 MHz with 2 watts output. Modulation, feedline and antenna as for VK2BDN. Receiver, crystal controlled converter first IF 50 MHz, second IF 15 MHz, third IF 1.6 MHz, fourth IF 455 KHZ.

That's a mighty fine effort chaps, and no doubt we will be seeing you lengthening that distance in the near future with signal reports like those exchanged. Thanks for letting me know Dick, and so allowing me to pass the good news on to evervone.

VK5LP

This has been verified as an Australian record — Ed.

Continued Page 18

*Forreston, S.A. 5233

AWARDS COLUMN

With Geoff Wilson,* VK3AMK

D.X.C.C.

PHONE

VK6RU	318/347	VK2APK	301/311
VK5MS	316/343	VK5AB	294/314
VK4KS	315/332	VK4PX	292/296
VK3AHO	307/326	VK4UC	291/293
VK6MK	304/328	VK4FJ	286/310
VK4VX	302/305	VK4TY	282/288

New Member: Call VK6DR, Cert. No. 140, Total 117/118.
Amendments: VK2SG 266/269; VK5WV 160/161

C.W.

VK3AHQ	306/326	VK3NC	271/297
VK2QL	301/327	VK6RU	265/291
VK3YL	293/313	VK3YD	261/281
VK2APK	292/302	VK4VX	261/263
VK4FJ	291/320	VK4TY	256/272
VK3XB	283/300	VK3TL	251/260

OPEN

VK6RU	318/345	VK4VX	308/311
VK4KS	316/337	VK6MK	304/328
VK4SD	316/334	VK4TY	303/321
VK2VN	312/334	VK2SG	302/309
VK2APK	310/325	VK4FJ	300/329
VK2EO	309/325	VK4UC	300/303

W.I.A. 52 MHz. W.A.S. AWARD

Amendment: Call VK3ZNJ, Cert. No. 78, Add. Countries 4

W.I.A. V.H.F.C.C.

Amendment: Call VK3ZNJ, Cert. No. 46, Confirmations 52 MHz 297.
Call VK3ZNJ, Cert. No. 47, Confirmations 144 MHZ 310.

"W.A.V.K.C.A. (V.H.F.) AWARD"

Certificate No.	Callsign
1	VK3AQR
2	VK3ZNJ
3	VK3ZGP
4	VK3AMK
5	VK3AOT
6	VK5ZWW

At present time certificates for this award are not to hand but will be forwarded to applicants immediately they become available.

*Federal Awards Manager,
P.O. Box 150, Toorak, 3142.

INTRUDER WATCH

With Alf Chandler,* VK3LC

INTRUDER WATCH REPORT FOR "AR" as at May 6, 1973

Further to a previous report let me announce that the Intruder Watch net is being held every second Monday of each month on a frequency of 3590 KHz commencing at 0930 GMT. This is a co-ordinators net, but any Member who would like to join is doubly welcome and could supply ideas that would enhance the operation of the Intruder Watch. Also it should be noted that the VK4 CO-ORDINATOR OPERATES A SIMILAR NET FOR Queensland Members on a frequency of 3620 KHz on the first Monday evening of each month at 1000 GMT.

As an exercise I am listing the known and identified Broadcast stations operating in our 7 MHz band. There must be narrow holes between these and other intruders where we can work DX, and it would be informative to other Members if such could be enumerated. A letter to me from any Member who consistently works DX on the 7 MHz band, with the frequencies would be appreciated. The following known Broadcast stations operate —

Radio Peking — 7010, 7025, 7035, 7058, 7065, 7095.
Radio Iran — 7034. Voice of Vietnam — 7040.
Radio Cairo — 7050, 7075. Radio Tirana — 7060, 7064, 7090.
Radio Pakistan — 7094. Voice of the Arabs — 7075.

There are many others, but as yet unidentified by me. Identification would be appreciated.

Alf Chandler VK3LC
Intruder Watch Co-ordinator for WIA. FE.

*1536 High St., Glen Iris, Vic. 3146

VHF Page Continued

Continued from Page 18

MOONBOUNCE PROJECT — FEBRUARY

An EME test with K2UYH and W6FZJ on February 13, did not produce any results due to them not getting on.

The LT4578 preamplifier was made ready for installation in the feed box of the dish but before doing sol it was checked out at the C.S.I.R.O. Radiophysics Laboratory in Sydney for noise figure and gain — bandwidth characteristics.

The MS175 post amplifier was also checked. Both preamplifiers were adjusted for optimum noise figure, which resulted in reduction of the MS175 post amplifier noise figure from 3.0db to 2.3db. The LT4578 preamplifier noise figure worked out finally at 1.2db!! The noise generator calibration was checked with a 50 ohm termination immersed in liquid nitrogen to confirm its accuracy. The gain-bandwidth was checked over a frequency range of 100-700 MHz with scope presentation.

It was most interesting to make adjustments and watch the characteristic curve vary! The automatic noise generator also allowed direct rending of noise figure to facilitate adjustment of the preamplifiers.

The STC converter used at Dapto and my home converter (Research Communications type) were also checked for noise figure.

Final Noise Figure results were
STC Convertor 5.9db
Home Convertor 3.4db
MS175 post amp 2.3db
MT4578 preamp 1.2db

Overall Dapto receiving system noise figure 1.6db.

The MT4578 preamp was placed in the feed box last Saturday (in place of the BFR91 preamp) and almost 2db more of Sun noise was received.

A tape of the 482 MHz NBL receiving tests, carried out in January, has been received from NBL together with photographs of the various signals as shown on the screen of a Spectrum Analyser. We showed up as more than 20db above noise. Comments on the test, included on the tape by the NRL group are most interesting.

Another EME test with K2UYH and W6FZJ is scheduled on 10th March.

Lyle VK2ALU

10.3.73 — EME Test with KLUYH and W6FZJ

The EME Test with KLUYH took place between 12.15 and 1300 EST on 10.3.73. Signals were heard from KLUYH at better strength than for previous tests, probably due to the use of the MT4578 receiving preamplifier in place of the BFR91 preamplifier at Dapto.

Some information was copied from each of his transmissions, best copy consisting of receipt o all the letters of the text. We were able to acknowledge this transmission with the standard report code letter "O".

KLUYH is using a 20 ft. dia. dish with linear polarised feed. He has recently obtained a 28 ft. dia. dish and advises that he intends to install both linear and circular polarised feed in it, probably by about next July. This should ensure a good readable signal to VKLAMW as the dish will have about 3db more gain and use of compatible circular polarisation will provide another 3db increase in signal strength.

The EME test with WGFZJ took place between 1300 and 1600 EST on 10.3.73.

Unfortunately only weak signals were heard and, although some letters were copied it was not possible to identify the callsign of the transmitting station. The problem may have been caused by rain at W6FZJ, which causes high losses in his transmitting feed system.

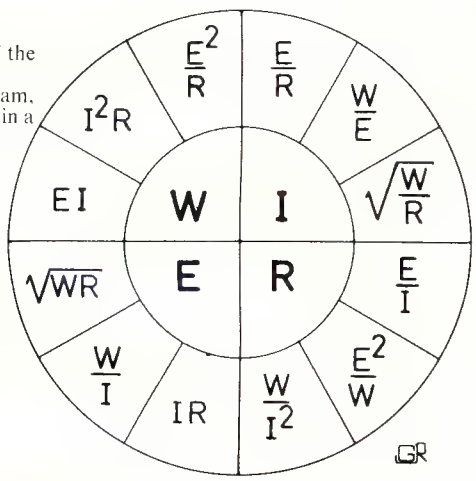
All letters have been sent to both of the above stations with regard to the result of these tests.

OHM's Law Simplified

Published hereunder is another version of the OHM's Law Tables.

For ready reference, cut out the diagram, mount on a stiff piece of cardboard, and place in a prominent position in your shack.

SUBMITTED BY
L. MARTIN—VK2II



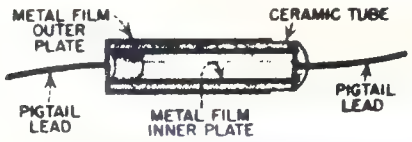
FIXED CAPACITORS

PART 2

BY C. A. CULLINAN
*VK3AXU

The Ceramic Capacitor

"Another type of capacitor which in some cases is comparable to the mica capacitor in electrical characteristics uses a ceramic as the dielectric material. A typical design is shown in Fig. 4. The capacitor plates are deposited on the inner and outer surfaces of a ceramic tube with connecting leads at either end. This unit is then sealed in a second ceramic tube and the whole assembly is wax impregnated for moisture proofing.



CERAMIC CAPACITOR CONSTRUCTION
FIG.4 A

"Ceramic capacitors are manufactured in a wide variety of characteristics, depending upon the type of ceramic used for the tube upon which the electrodes are deposited. Since some of the ceramics have very high dielectric constants, the volume efficienty (micromicrofarads, cubic inch) is high. Titanium dioxide ceramics, for instance, are used extensively for their high dielectric constants (90-170), low losses and low temperature coefficients. Since the temperature coefficient can be controlled by the ceramic mixture, units ranging from essentially zero to high negative values of temperature coefficient are available for temperature compensation.

"Experience has shown that in practice it is only necessary to provide three ranges of capacitors with temperature coefficients which correspond to changes in capacitance values of 0, -150 and -750 parts per million per degree C.

"These ranges are marked by the code symbols NP0, N150 and N750 respectively. "However for applications where these three ranges are not suitable capacitors are manufactured in the range of + 100 ppm. to — 4700 ppm. temperature coefficients.

"Due to the coaxial type of construction, tubular ceramic capacitors have low values of residual inductance.

"One grade of ceramic capacitor is used interchangeably with mica capacitors in critical r.f. circuits, while a lower quality variety which has very high volume efficiencies but poor stability, is used for general purpose applications such as by-passing. Ceramic tubular capacitors are usually more expensive than equivalent mica units. However, disk type ceramic capacitors are less expensive than equivalent mica capacitors."[1]

"Ceramic capacitors are manufactured in a wide variety of mechanical styles, such as Wire Wound Trimmers, Tubular, Disc, Stand-off, and Feed-through, the latter being available in many configurations for specific needs. "The wire-wound trimmers are designed for use in radio frequency circuits or any other electronic application where trimming of capacitance might be required. An ideal application is that of trimming the radio frequency circuits of radio receivers. Another use is the balancing of deflection yoke coils in T.V. receivers.

"The capacitor dielectric is a high quality ceramic material with good power factor, high leakage resistance, and excellent capacitance retrace characteristics under varying conditions of temperature and humidity.

"By unwinding the regulating wire the capacitance can be reduced continously from the maximum shown overleaf to the minimum. The wire is applied to the outside of the tube under constant tension and all turns are securely soldered. The inside of the tube is silvered in the normal manner and one connection is taken therefrom.

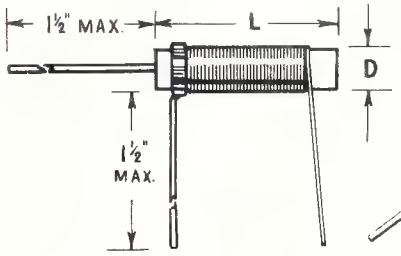
"In general three types of wire-wound trimmers meet the majority of needs. These may be listed as

TYPE 1 has a positive temperature coefficient of capacity to compensate the negative temperature coefficient of inductivity of iron powder coil tuning slugs.

TYPE 2 may be used where a high capacity value is necessary and medium temperature coefficient is acceptable.

TYPE 3 (High Voltage) is used where the voltage is in excess of 500V DC but does not exceed 2500V DC. A negative temperature ceramic dielectric body is used to provide the necessary capacitance range.

"By varying the ceramic dielectric of the trimmers or the tube dimensions wire wound trimmers can be made with capacitance values in the order of 10,000 pF."[2]



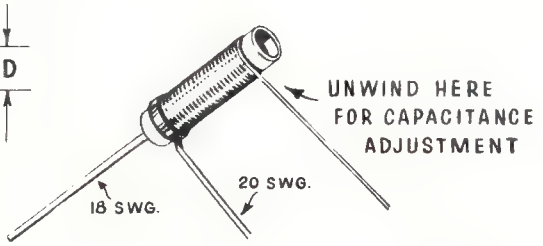


FIG 4B

Radio Parts Pty. Ltd., 1970-72 catalogue, lists a great variety of ceramic capacitors in ranges from 1 pF to 20,000 pF and in voltage ratings from low for transistor application to 5,000 V. DC. working.

The overall range in style, capacitance and voltage ratings is far too extensive to be detailed here, so reference should be made to the above catalogue.

Transmitting Capacitors

Generally there are three main uses for mica or ceramic capacitors in a transmitter. 1. They may be used as blocking capacitors in which application they may be subjected to a relatively high voltage, either DC or relatively low frequency AC and to fairly low RF currents.

Such an application would be in the plate circuit of an oscillator or amplifier in which the capacitor is used to block the DC voltage applied to the plate of the valve from the output circuit. i.e. interstage coupling or coupling to an RF output system.

2. The capacitor may be used in by-pass circuits where it may be subjected simultaneously to DC or AC voltages of relatively low frequency and to relatively high r.f. currents.

In one typical high-power installation mica capacitors are connected from each side of the directly-heated value filament to ground.

Each capacitor is of 10,000 PF, peak DC voltage rating is 2000V and maximum RF current to 1 MHz is 10 amperes. These capacitors effectively remove RF from the secondary of each of the modulated amplifier transformers and the cathode bias resistor.

In another application a high-voltage mica capacitor is connected across the output of the high-voltage power supply to reduce the possibility of RF energy passing back into the rectifiers because the filter condenser may possess considerable inductance and not be effective at RF.

Where audio-frequency amplifiers are to be used in the vicinity of transmitters it has been the writer's practice for a great many years to place an 0.01 MFd mica capacitor in parallel with the final HT filter capacitor to by-pass any RF currents that may get into the amplifier via the power supply. This by-pass is in addition to any AC line filter that may be used.

3. The third application is the use of the capacitor in tuned circuits, such as oscillator or amplifier "tank" circuits or RF filters handling large amounts of power. In such applications the DC voltage and RF currents may attain large magnitudes.

Where any doubt exists as to the suitability of a capacitor for a specified purpose it is advisable to consult the selected manufacturer of one's choice as failure of a capacitor could cause expensive damage to a transmitter.

In recent years Ceramic RF power Capacitors have been replacing mica capacitors in many transmitter applications up to a capacitance of about 2,000 PF for single units.

Such capacitors exhibit lower losses than their mica equivalents.

In one installation the substitution of ceramic capacitors for mica capacitors in an Aerial Coupling Unit resulted in a marked reduction of harmonics, together with better overall efficiency so that the transmitter could be run at a lower power output for the same aerial power.

*6 Adrian St., Colac. 3250.

For an amateur station this would have meant a few more watts into the aerial for the same DC input to the final RF amplifier.

In respect to RF Power Ceramic Capacitors the writer has had experience with only one make in which power ratings range from 5KVA to 50KVA. Capacitances are from 12 PF to 2,000 PF whilst temperature coefficients are from P100 to N750. RF current ranges are from 10 amps to 50 amps all up to 20 MHz.

Power factor maximum is 0.05% for all capacitors whilst maximum operating voltages are either 7,500 or 10,000 depending on the model. (Peak AC voltages plus DC components.) Minimum insulation resistance is 25,000 megohms. Various catalogues show a great variety of mica or ceramic capacitors for RF circuitary as well as high-voltage large capacitance units in either mica or other insulating materials for HT filters. One such oil-filled capacitor is rated at 2mfds 75,000 V.DC working.

TUBULAR CAPACITORS

Paper Types

"Capacitors using wax or oil impregnated paper dielectric are employed extensively in DC, audio, and low frequency RF applications where high capacitance per unit volume and low cost is required. They are characterized by generally poorer electrical characteristics than mica or ceramic capacitors, including; higher power factor, larger temperature coefficients, lower operating voltages, higher inductance and shorter life. These factors depend to a large extent upon the type of impregnant used, the purity of the impregnant, the method of construction, and the casing employed.

"Wax is used as the impregnant in a large variety of utility capacitors for the lower voltage ratings, where small size and economy are important. The tubular capacitors used in receiver audio, blocking, and by-pass work are examples. Moisture absorption shortens the life of cardboard-cased wax capacitors to some extent, as does high ambient temperature.

"Castor oil, mineral oil, and chlorinated synthetic oils such as 'askerels' are used in paper capacitors for higher operating voltages and greater dependability. Mineral oil filled units have the best temperature characteristics and lower power factors, but are about 35% larger in volume because of the lower dielectric constant. For this reason, castor oil filled condensers are used in most non-critical applications or where space is at a premium.

"Typical paper capacitors have temperature coefficients of capacitance approximately ten times larger than high grade mica capacitors, such as the silvered-mica types. Power factors are greater by at least one order of magnitude and inductances are larger, especially in the types using

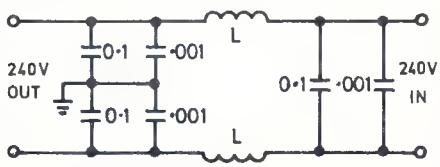


FIG 5 ILLUSTRATING USE OF DUAL BY-PASSING.

paper-foil rolled construction in which the contact tabs are at the ends of the rolled foil plates. In paper capacitors of advanced design residual inductance is minimized by the use of the extended electrode construction, in which electrical contact is made at the edges of the rolled electrodes, so that charging-current paths are short.

"In applications where a wide range of frequencies must be effectively by-passed, as in the line filter shown in Fig. 5, a high capacitance paper capacitor may be used in parallel with a small mica unit. Otherwise, the residual inductance of the paper condenser may make it ineffective as a by-pass for the high RF frequencies. "Here are some notes regarding the practical use of AC line filters such as shown in Fg. 5.

"The first concerns an AC/DC broadcast receiver. Reception of even a local station about three miles away was marred by high level noise from the AC power line. This noise was getting into the receiver via the AC power circuit as the set did not have an isolating power transformer. A filter similar to that of Fig. 5 was installed and effectively eliminated the noise. In this case the aerial did not pick up the noise.

"The second case was that of a manufacturer who installed a number of small AC/DC electric motors to drive small machines. These motors were located about 30 feet from the manufacturer's final test position for his radio receivers. The noise from the motors completely put a stop to 'sensitivity' and 'alignment' in the 'final test'. The solution was to mount filters similar to Fig. 5 in metal screening boxes which were attached directly to each motor in such a manner that there were no exposed leads from the motor. Referring to Fig. 5 the AC input was on the right-hand side and the motors connected to the left-hand side of the diagram.

"The third case was similar. A non-radio manufacturer had installed some commutator type motors and the noise from these had been suppressed at broadcast frequencies by connecting a small capacitor across the motor terminals. Local BC stations were only a few miles away.

"However during World War II, the manufacturer wanted some members of his staff to be able to listen direct to BBC news on short waves. For this purpose a good SW receiver had been purchased and a 'spider web' aerial erected.

"But the universal motors put a stop to shortwave reception. Again the cure was to fit filters as per Fig. 5 right on each motor.

"The last case concerns BCI of a rather different nature to the usual type. A licenced amateur was using mercury vapour rectifier valves in his transmitter power supplies and 'hash' was escaping through the AC mains into his neighbour's radio sets. (His own receiver was off when he was transmitting and the 'hash' did not get into his family's BC set. Many of the cheaper BC sets did not use an electrostatic shield between the primary and secondaries of the power transformer and such sets were very prone to noise getting in via the AC mains. It is also possible that his HT transformer did not have an electrostatic shield either.)

"Anyhow the simplest cure was to install a filter similar to Fig. 5, using heavy duty RF chokes, in the AC power lead to the entire transmitter. This filter completely removed all traces of the 'hash'.

"Another by-passing device used in video i.f. amplifier design consists of using capacitors which are self-resonant at the frequency to be by-passed.

"A value of capacitance is chosen which is series resonant with the inherent inductance of the capacitor and its leads. This type of single-frequency by-passing is very effective.

"Paper types of capacitors are still being manufactured in 1972 although plastic dielectric capacitors are rapidly gaining in popularity."

Plastic Tubular Capacitors

In recent years, and particularly since the invention of the transistor there have been growing demands by the electronics industry for cheaper and smaller components. Also there has been a greater demand for better reliability, particularly from various Defence forces.

These demands caused capacitor manufacturers to investigate new materials, particularly dielectrics and recourse was had to the Plastics industry for a substitute for paper in the manufacture of tubular and block capacitors.

Possibly the earliest use of modern plastics was the development of paper dielectric tubular capacitors which were encased in a metal container instead of the previous cardboard container which could absorb moisture from the atmosphere as if there is one thing capacitors do not like it is moisture.

One of the plastics is PTFE (Polytetrafluoroethylene). This material possesses excellent electrical characteristics such as high dielectric strength, extremely high insulation resistance and low losses. Most importantly it is one of the few plastics that is completely impervious to water.

By using PTFE for hermetic end sealing of tubular paper capacitors it became possible to increase reliability of tubular capacitors through the exclusion of water.

The following data on PTFE makes interesting reading.Volume Resistivity $> 10^{1}$ ohms per cm
Surface Resistivity at 100% RH $> 3.6 \times 10^{}$ megohms
Power Factor at 1 MHz < 0.0005
at 10 MHz < 0.005
Water absorption. Nil

Capacitors made as described can be used over the temperature range of — 100°C to + 160°C depending on the goodness of the paper dielectric.

There are three methods of manufacturing tubular capacitors.

In the first method two thin foils of aluminium are wound on a machine which interleaves the foil between two ribbons of paper or other dielectric material.

The ribbons of dielectric overlap the metal foils on both sides. As the ribbons and foils are wound on a rotating device each becomes a spiral as viewed end-on. When sufficient material has been wound on connecting wires are attached to the outer ends of each foil. The wound capacitor is then placed in a protective casing and sealed (after having been vacuum impregnated in a natural liquid impregnant). The capacitor is then tested for voltage breakdown and capacitance, and possibly power factor. If satisfactory it is then labelled. Each manufacturer has his own test procedure which may involve elaborate tests on each completed capacitor or on a random selection basis.

If a capacitor such as that just described is cut through to expose its cross-section it will be observed that each metal foil is in fact a single coil of metal each turn being slightly larger than its predecessor. This means that each metal foil has a definite amount of inductance. This inductance can be very troublesome in some circuits causing spurious oscillation in Amplifiers and distortion in Audio-frequency amplifiers.

The second method. In this the capacitor is wound with overlapping foils. In making these capacitors one metal foil projects over the side of one dielectric ribbon, whilst the second metal foil projects over the other side.

When the capacitor is wound the metal foils on each side are swaged together and the lead wires attached in such a way that contact resistance is negligible.

This method of construction reduces the self-inductance of the capacitor to a minimum and such capacitors are known as "non-inductive". The encapsulation and testing

then follows.

The third method of construction makes use of a metallized film of dielectric instead of separate metal foils.

The dielectric film is metallized in equipment which consists of a vacuum chamber fitted with several evaporating crucibles, to evaporate the metal (aluminium) and a cooling system to condense the aluminium vapour on to the surface of the dielectric film.

The thickness of the metal layer is controlled by measuring its resistance as the film moves between rollers. The deposited metal covers the entire surface of one side of the dielectric film which has considerable width.

To metallize the dielectric film successfully it is necessary that the evaporated metal bonds well to the film, that the metal evaporates easily, has high electrical conductivity and be in a pure state. Aluminium meets all these requirements.

The next step is to slit the metallized film into desired widths and at the same time evaporate a thin strip of the metal from the edge of the film to prevent short-circuits between two metallized films when they are wound. The process is known as margin burning. Obviously the heat required for the margin burning must be sufficient to evaporate the metal yet not strong enough to burn the film.

Because of this not all dielectric films can be used for metallizing.

In winding the capacitor two films are wound together with a positive overlap.

After winding the ends of the winding are sprayed with a mixture of tin and zinc for lead attachments, thus making a "non-inductive" capacitor.

In 1972 it would appear that three plastic materials are being used in tubular capacitor manufacture. These are Polystyrene, Polyethylene, and Polycarbonate and each has its own advantages and disadvantages.

"Polystyrene, itself, is not employed in metallized film capacitors as it must be greatly derated.

The properties of capacitors normally reflect the intrinsic properties of the insulating material.

The following table shows the intrinsic properties of the three plastic insulating materials referred to above.

With all the research being done by the plastics industry and the capacitor manufacturers it is certain that newer plastics will be developed for insulation in capacitors.

With all the research being done by the plastics industry and the capacitor manufacturers it is certain that newer plastics will be developed for insulation in capacitors

Feed-through Capacitors
Stand-off Capacitors

Frequently a need arises to by-pass a circuit element where it passes through a metal chassis or metal screen. Such a need could appear in the H.T. lead or Bias lead to a transmitter. After all it is not much use if elaborate shielding is employed to keep harmful harmonics within a transmitter assembly if they can escape via connecting leads.

Feed-through capacitors are made so that they have a general tubular shape, with leads at each end, or a ceramic tube. The outer electrode is not insulated so that it may be attached directly to the chassis either by soldering or by a nut which is threaded on to the body.

In use part of the capacitor will be on each side of the metal wall or shield.

The stand-off type is made to be soldered or screwed directly to the chassis on one side and is used to by-pass circuits directly to the chassis, such as screen or cathodes of valves.

	POLYSTYRENE	POLYCARBONATE	POLYETHYLENE TEREPHTHALATE
Dielectric Constant 1 KHz	2.9	2.8	3.3
100 KHz	2.9	2.75	3.2
Dielectric Loss 1 KHz	2×10^{-4}	9×10^{-4}	6×10^{-3}
100 KHz	3×10^{-4}	12×10^{-4}	17×10^{-3}
Volume Resistivity Ω—cm	$> 10^{18}$	2×10^{17}	1×10^{18}

Ref 5

Note the distinction between feed-through and stand-off types.

Both types are available in capacitance values up to 4,700 pf quite readily. Usually their DC working voltage is 500V and insulation resistance not less than 10,000 megohms.

Both types are effective up to several hundreds of mega-hertz. They have very small lead inductance.

They are most useful in reducing T.V.I. from Amateur transmitters but care must be taken to watch the voltage ratings. There are some types rated to 3000V AC or 5,000V DC.

Co-axial Capacitors

Mention has been made of the use of Ceramic feed-through capacitors for insertion in H.T. and Bias leads in transmitters to reduce harmonic radiation from exposed leads.

Except in very low powered transmitters valves are still used in the output (final) amplifier and even with by-passing of the valve heater pins right at the socket it is possible for harmonics to escape and radiate if the power supply is on a different chassis.

One method of reducing this trouble is to fit co-axial capacitors in the heater leads at the transmitter chassis.

Co-axial capacitors have capacitances up to 0.5 mfd, are rated to 50 volts DC working and are effective up to at least 200 MHz, furthermore some types can carry up to 40 amperes.

Essentially they are three terminal devices, (in - out and earth) and are similar to a low-pass filter.

They find great use at HF VHF and UHF for filtering DC leads in vehicles, and boats where noise from such circuits is troublesome in receivers.

Radio Noise Suppression

Every time that an electrical circuit is made or broken there will be an arc or a spark depending on whether the circuit is DC or AC. In some cases the arc or spark may be so minute that it is not visible or it may be so large as to be readily seen.

From the viewpoint of a Radio Amateur, a radio listener, TV viewer or Hi-Fi enthusiast such arcs or sparks may cause objectionable interference either as sound in a receiver or to the vision and possibly the sound in a TV set, or FM set.

(To be continued.)

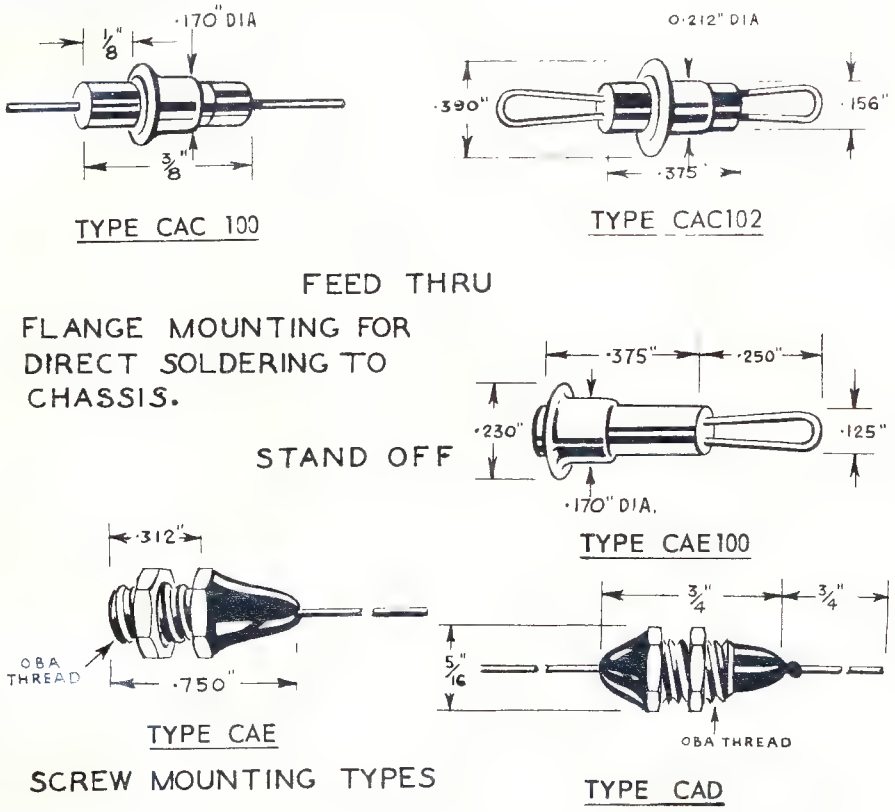


FIG 6 DUCON FEED THROUGH AND STAND OFF CERAMIC CAPACITORS.

NEWCOMER'S NOTEBOOK

With Rodney Champness,* VK3UG

Test Instruments for the Amateur "Shack". (Part 1)

What types of instruments are desirable for the SWL or new amateur? There are quite a few instruments either commercially made or which you can construct yourself to help with the proper operation of your station.

Number 1 on the list is without doubt the multimeter. I would suggest purchasing one costing not less than $10 and with a sensitivity of 20,000 ohms per volt. It should have low voltage ranges as low as five volts or less full scale for transistor work and voltage ranges to at least 1,000 volts full scale deflection. These ranges should be both AC and DC. The current ranges full scale should be from 50uA to 250ma at least, preferably up to several amps. Meters to do this are usually more expensive. Be very careful when using the very low current ranges as it is so easy to burn out a meter — even if it is "protected" with zener diodes. Most multimeters will have three or four ohms ranges. Sometimes these don't always cover some of the ranges that you may require. Usually the low ohms range that you would want is missing from every meter you see, so it is a matter of looking at as many meters as possible and finding out which one more nearly fits your requirements.

How is a multimeter used? A multimeter is used to measure voltages, currents and resistances in circuits. This is to ascertain what the correct operating conditions are, and to check when something goes wront to, where it has gone wrong. To measure voltage the test prods are placed across the part of a circuit where voltage is expected to be found. If it is not known what voltage is expected, it is desirable to start with a high voltage range and work down. To measure current it is necessary to insert the multimeter in series with the current drawing device. This involves unsoldering a lead, maybe, and putting the two multimeter leads one to each unsoldered end. Current measurements are not often done because of this messy procedure. Resistance measurements are only done with the circuit dead. It may be necessary to isolate the component being tested as other parallel resistance paths may exist so giving you erroneous readings. For instance you may have a series parallel system of resistances as per figure 1. To determine if any particular resistor is faulty one end of the resistor must be isolated, or one of the capacitor if you are testing for leakage. These are the basic things that a multimeter can do. With various adaptors a lot more things can be done.

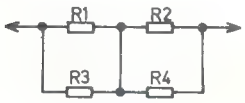


FIGURE 1

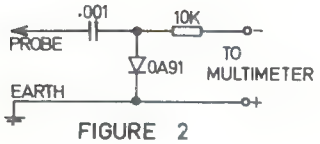
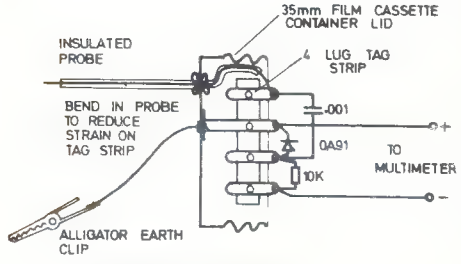


FIGURE 2

One simple addition to the multimeter is an RF probe. Figure 2 shows the circuit of a simple probe. The probe should have leads as short as you can make them from the probe tip to the capacitor through the diode to the earth terminal. This is more important as you go up in frequency. A suitable container for the probe would be inside a 35mm metal film cassette. Build the works on to the inside of the lid as this will make it much easier to work on. A small four lug tag strip mounted on the lid of the film cassette will do to mount the components. The probe is insulated from the case where it goes through it. Heavy single strand insulated household wiring should do. A small rubber grommett around this insulated wire will help to stabilize the wire and cause little strain on the tag strip. A couple of bends on either side of the grommet will help to hold the probe in position. Unfortunately the insulation just mentioned doesn't have good high frequency or very high frequency characteristics so it could be a bit "lossy". This is unavoidable unless you can get some other type of low loss insulation. Don't worry too much about this at the moment. The probe is capable of measuring RF voltages up to about 35 volts with the OA91 diode. It would be ideal for many transistor rigs and for low power sections of valved rigs. A physical diagram of the probe is shown in figure 3. The reading of this meter is relative but probably could be calibrated, although I doubt that many would worry about that. The complete container acts as a very effective shield.



RF PROBE – FIGURE 3

Having described the most useful of the instruments in the "shack" and an accessory, I wonder which could be considered the next on the list? I personally believe that the signal generator is next. The Leadeer LSG11 commonly advertised in "Amateur Radio" is quite good value for money. It is capable of giving signals from 120 KHz to 130 MHz on fundamentals and up to 390 MHz on harmonics. It can be modulated by either of two audio tones, which are also available on the front panel. Considering the price it is a remarkable stable instrument once warmed up and the dial calibrations are good. The modulation percentages are less than stated on the info that comes with the unit. In March 1970 issue is a conversion of the LSG11 to fets.

A signal generator is used to generate signals on all the likely frequencies that a receiver is likely to pass through the various stages. It means that should your receiver appear "dead" and a check with a multimeter yields no results, a dynamic test with the signal generator is likely to show the defective stage — and possibly the component. Consider that the set is dead. The logical place then is to check the audio amplifier. Apply audio from the signal generator to the grid of the first audio stage or the base if transistorised. A convenient spot to apply the audio is across the volume control. If no output is heard at any setting of the volume control it can be fairly safely assumed the audio stages are at fault. In a simple BC mantel set this one test effectively cuts the set in half. If there is good output at this point, the trouble lies either in the IF stage(s) or the converter. Place the RF output via a small value capacitor (about 0.001uf will do) to the output must be on the supposed IF frequency, which is usually 455 KHz in the common domestic set. If you now get no output either you have troubles in the IF stage or you have forgotten to either put modulation on the signal generator or have the output at too low a level. You may think who would make this mistake.- Plenty have. Let's assume that it doesn't work. What sort of thing could be wrong? Lots. Is the valve alight? If not, the voltages could be near correct because screens and plates of several valves could be near correct because screens and plates of several valves may be paralleled as far as DC is concerned. The same can apply to transistors. The coils could be faulty, or some jerk has wound down all the tuning slugs to "tighten them up". These are only a couple of faults of the many that can occur in this stage. The converter stage can be difficult to check if you don't know how to check it. The local oscillator when it is operating in a domestic set valved or transistorised has an output 455 KHz above the supposed received signal. For example, if you tune to 1,000 KHz the local oscillator should be on 1,455 KHz, which can be tuned in on another set, if it is operating. A simple test — yes!! There is much that I could tell you about basic servicing if you want. A very good book although only dealing with valves is "Wireless Servicing Manual" by W. T. Cocking published by Iliffe. The basic text can also apply to transistors. It may be a hard book to obtain.

An article has been passed on to me by the technical editor written by Harry Heathcote of Maidstone. I hope to present Harry's article along with some ideas which I hope to resurrect from some much earlier "Amateur Radio" Basically Harry's article is on modifications to standard broadcast receivers to get them on 160 metres as well as an aerial and a source of CW practice.

Does anyone feel like helping me with this column on subjects that frankly I need tuition on? If anyone can help it would be much appreciated by me and should prove more beneficial to the out newcomers than if I try to explain things. Has anyone got an old post war broadcast receiver preferably five valves which uses about 250 volts DC HT? If anyone has one and would like to donate it to the cause, a friend and I hope to be able to prove that a low power transmitter can be built using most of the parts in an old set. About the only parts that would be necessary to buy would be a microphone and a key. The most likely band that this would operate on would be 160 metres or perhaps 80 metres. Anyone feeling generous? The transmitter would run between five and 10 watts input.

In a month or so I hope to have further additions to the list of desirable equipment for the new amateur or short wave listener, for testing his station

44 Rathmullen Rd., Boronia, Vic. 3155

VHF BAND-PLANNING; REPEATERS

The Committee spent some time on the Two Metre FM Band Plan — This plan is based on the decisions of the recent Region 1 meeting of the I.A.R.U. and the same basic channelling plan is used — An approach was also made to the PMG for permission to establish and operate repeater stations on VHF and — the PMG kindly agreed to this. Report from Johannesburg in Radio ZS of February 1973.

TRANSISTORS

Twenty five years of solid state. If you were 30 when these components began to see the light of day you would now be 55. The jet age, moon-walking, planetary probes — all arrived in your span of life. How remarkably does the development of one invention lead to advances in quite unrelated fields. What will follow the satellite era?

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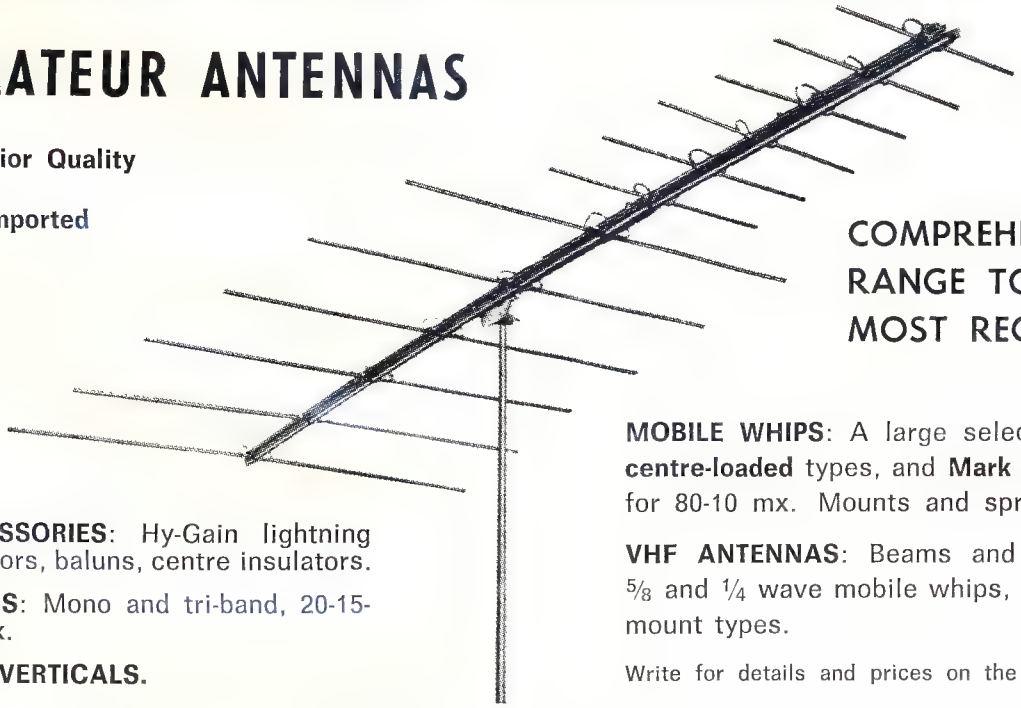

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NOTE: Past issues are normally available from stock but the price previously quoted was in error as including 1972. Correct prices are—

PAST ISSUES—*A few sets of 1969-70-71 with free binder are still available at $10.50 per set plus postage 50c.

Sets of 4 issues for 1972 are available at present for $4.20 plus 20c post.

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Ionospheric Predictions

With Bruce Bathols, VK3ASE JUNE 1973

Hereunder are the predicted band openings for June 1973 from information supplied by the Ionospheric Predictions Service Division. Times are G.M.T

28 MHz

This band has virtually closed for DX with very little activity predicted. JA's may occasionally be worked from Noon local time until sunset

21 MHz

VK3 to ZL		2200 0600
.. .. SU		0400-0800
.. .. KH6		2100 0700
.. .. ZS		0600-0800
.. .. G	S.P.	0800
.. .. G	L.P.	2300
.. .. VK0		0200 0400
.. .. VE3	S.P.	0200
.. .. VE3	L.P.	2400
.. .. UA		0500-0800
.. .. W1		2400 0300
.. .. VK9		2200 0800
.. .. PY		2200 0100
.. .. W6		2100-0600
.. .. JA		2200 0800
.. .. 9G1	S.P.	0700 0800
.. .. 9G1	L.P.	2300
VK6 to SU		0400-1000
.. .. ZS		0500 1000
.. .. G	S.P.	0700 1000
.. .. UA		0400-1000
.. .. W6		2300 0600

14 MHz

VK2 to SU		2100 0700
.. .. ZS		0500 1000
.. .. G	S.P.	1200-1800, 2100 0100
.. .. G	L.P.	2100 0900
.. .. UA		1000 1800, 2100-0100
.. .. W6		0200-1800
.. .. PY		2100-0100
VK3 to ZL		2100-0900
.. .. SU		1800-2000, 2200 0400
.. .. KH6		0200 2100
.. .. ZS		0500 1000
.. .. G	S.P.	1200-0200
.. .. G	L.P.	2100 0800
.. .. VK0		2200 0700
.. .. VE3	S.P.	0100 0600, 1100 1600
.. .. VE3	L.P.	0900, 2300-0500
.. .. UA		1000-0200
.. .. W1		0100 0800, 1100-1500
.. .. VK9		2100-1800
.. .. PY		2200 0100
.. .. W6		0200 1800
.. .. JA		0600-1800, 2100 2300
.. .. 9G1	S.P.	0600-0900, 2300 0300
.. .. 9G1	L.P.	0200 1000
VK4 to SU		1200 1700, 2100-0300
.. .. ZS		0500 1100
.. .. G	S.P.	0900 1600, 2100-2400
.. .. G	L.P.	2100 1000
.. .. UA		1000 1600, 2100-0100
.. .. W6		0200-1600
.. .. PY		2100-0100
VK5 to SU		1200, 1600 0400
.. .. ZS		0500 1100
.. .. G	S.P.	1300-0200
.. .. G	L.P.	2200 0900
.. .. UA		1000 1900, 2200-0200
.. .. W6		0200-1800
.. .. PY		1000, 2300 0100
VK6 to SU		1200-1300, 2000, 2400 0500
.. .. ZS		0400 1200
.. .. G	S.P.	2400 0400, 1300
.. .. G	L.P.	2300 1000
.. .. UA		1100 1300, 2300 0300
.. .. W6		0300-1800
.. .. PY		1000-1100

7 MHz

VK2 to SU		1600 2200
.. .. ZS		1400-2300
.. .. G	S.P.	1900-2100
.. .. G	L.P.	0500-0600
.. .. UA		1600 2100
.. .. PY		0500-1000, 2000 2100
.. .. W6		0600 1400
VK6 to SU		1600 2400
.. .. ZS		1400 0100
.. .. G	S.P.	1800-2300
.. .. UA		1600-2300
.. .. PY		0900-1000, 1900 0100
.. .. W6		0900-1400
VK7 to SU		1600 2300
.. .. ZS		1400 2400
.. .. G	S.P.	1800-2200
.. .. G	L.P.	0500-0600
.. .. UA		1600 2200
.. .. PY		0400 1000, 2000-2300
.. .. W6		0600-1400

PROJECT AUSTRALIS

With George Long, VK3YDB

OSCAR 6

Effective from early May AMSAT has implemented, on a world-wide basis, the following schedule for the satellite—

ON: Thurs, Sat, Mon GMT

OFF: Fri, Sun, Tues, Wed GMT

In terms of Australian E.S#T. this means the satellite will be on from

10.00 hours Thurs to 10.00 Fri

10.00 hours Sat to 10.00 Sun

10.00 hours Mon to 10.00 Tues

i.e. ON for Thursday, Saturday and Monday nights and Friday, Sunday and Tuesday early mornings.

OSCAR 6 REMINDERS

If you discover the satellite is ON at any other times than listed above please do NOT transmit through it because it may be on for special reasons—e.g. command station taking telemetry data.

Please take heed of the radiated power limitation.

GENERAL

The new schedule for OSCAR 6 is designed to provide more frequent battery recharge periods.

From I.A.R.U. Headquarters comes the news that AMSAT believes OSCAR 6 will achieve the one-year design lifetime but the complete co-operation of users now becomes an increasingly vital factor. There is evidence of some battery degradation but this is not a necessary indicator of shortened life.

OSCAR MOBILING

The rest of these notes were written by Fred J. Murray, W2GN, and were received from the President of AMSAT.

"As many of us know, part of the fascination in OSCAR 6 operation is in hearing just about how your signals are doing as you listen to them on the ten meter down link. While I was installing two meter gear in a new car recently, it came to mind rather readily that all I had to add to the two meter gear to have a mobile OSCAR 6 ground station was to provide crystals for the up-link, keying facilities, a ten meter receiver and a ten meter antenna. One trial after the installation was complete indicated that we were 'in business'. On an overhead pass the signals came through on the down-link for almost the entire pass from s3 to s6.

"The rest is history of what are apparently the first mobile to base station contacts through an amateur satellite. A schedule was made with Jack Colson, W3TMZ, for the first QSO on orbit 1983, March 22, 1973. This contact was made immediately although with some difficulty due to a high noise level at my end. I thought I had packed a good spot, overlooking the city of Albany, N.Y. and for miles around. It was good when I tried it in the daytime but on the evening overhead pass of OSCAR 6 the noise from all those lights in the city came up to a point which almost masked Jack's signal which is normally easy copy. Thus was learned the first lesson on locations. Now, I look for an electrically quiet location off the main highway where it is flat for a few miles around and free from any nearby obstructions. OSCAR has the 900 mile altitude built in. Communications through OSCAR 6 can be had anywhere that you can 'see' the satellite and are free of excessive electrical noise. Quiet spots are easy to find out in the countryside so receiving conditions are usually just great compared to the home location.

"Completely fascinated by my easy success, I drove to various nearby spots to try the overhead passes. Contacts were made as follows: Orbit 1990: W5VY, orbit 2002: W95GH, orbit 2003: W9MAL, K1HTV, orbit 2008: K1HTV, W9RGH, W1JSM and orbit 2015: W4PSJ, W7ZC.

"With the confidence inspired by these QSO's, I drove over to ARRL Headquarters on March 26, and made a demonstration in the parking lot under all those W1AW antennas with Bill Dunkerley, WA2INB and Dave Sumner, K1ZND in the car. A readily made contact on orbit 2028 with W7ZC, K4TI, and K6DS generating some enthusiastic discussion during the lunch hour.

"The two meter antenna up to this point was a 5/8 wave base-loaded whip. I next tried a squalo mounted the standard distance above the car roof. With this antenna, I worked K0DDA on orbit 2065 and W4PSJ and W9JIY on orbit 2077. It didn't seem any better than the whip so I put that back on and worked W7ZC and W8DX on orbit 2078. Next I tried the 'big wheel' setting on a box over the car roof. I worked W0JKF, VE3TW and K4TI on orbit zogo with the wheel but again it didn't seem any better than the whip. These meagre tests are not conclusive of course. Some day we will know what is the best vehicle antenna for these overhead passes.

"The next episode took form on the Monday evening OSCAR 6 net on 3855 KHz on April 2. On my turn, I briefly summarized the results of the mobile operation suggesting that we know it works but what, for the present, can we do with it?

"The obvious answer to this question was Vermont, less than an hour drive from my location with no known OSCAR 6 activity. As luck would have it, I had to make a trip over to Bennington on April 5. So, while the net was buzzing along, I figured the orbit times for the 5th and it was left on the net that I would be on at Bennington for orbits 2152 and 2153. We hadn't scheduled the wx, and the morning of the 5th found me in an April snowstorm a couple miles west of Bennington working K1HTV, W3TMZ, VE2BYG and WB2DEI on orbit 2152, for what are probably the first OSCAR 6 QSO's from Vermont.

"For the next orbit 2153, with some help from a QST by W3TMZ, the boys had found me and I worked K1HTV, W3LUL, W0JKF, K7BBO, W5VY, W7ZC, W6BGJ, W8DX and WA4JID from the battle monument hill in Bennington. I got a tremendous kick out of this as it was the first time in my over 50 years of operating that Stations were trying to work me. It is testimony to OSCAR 6 coverage that all U.S. Districts except 9 were worked on these two passes.

"The hardware used is depicted in the photograph below. It is all standard commercial gear — easily duplicated. If you plan, as I did, to use CW, an operating platform is needed ... I used a piece of plywood hooked under the dash and held down by a seat belt. For safety, everything **must** be securely fastened. This plywood board and the gear on it can be removed in five minutes or less if the wife insists on riding in the front seat.

"I hope my experience will prompt some more mobile work. OSCAR 6 offers the world's most exciting repeater operation."

Smoothed Monthly Sunspot Number Prediction for June is 36. The smoothed mean for September '72 was 62.0 Predictions for July, August, September are 34, 32, 30 respectively. (Swiss Federal Observatory, Zurich.

Commercial Kinks

With Ron Fisher,* VK3OM

A Noise Blanker from the FT 200.

At long last the long awaited blanker designed especially for the FT 200. Firstly, all the credit for its development and design goes to Mr. Fred Bail and his staff at Bail Electronics of Box Hill.

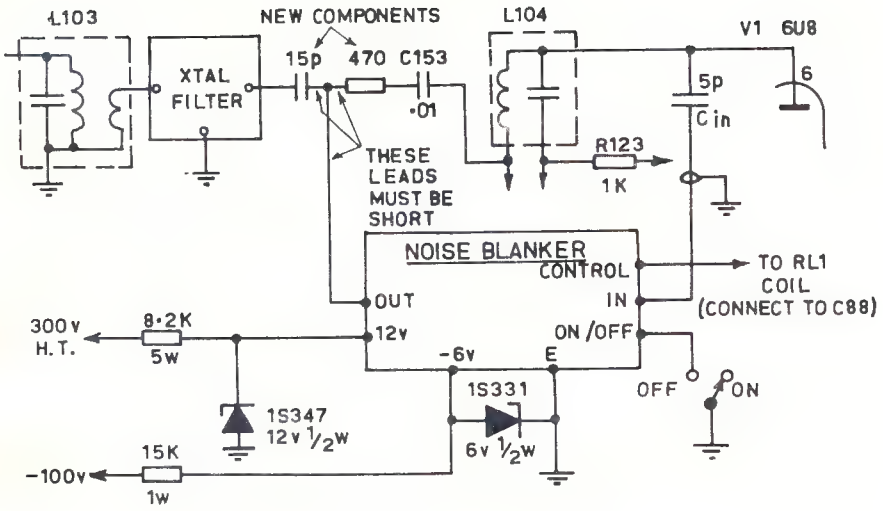
It is not intended to go into a lengthy description of its operation or construction as it is felt that the circuit is self explanatory. The blanker was built up on a small piece of Vero Board, the actual layout following the circuit layout.

At first glance it might be assumed that the blanker on/off switch could be connected in place of the FT200 noise limiter switch, however, the operation of the blanker is greatly assisted by the old limiter. It seems that the limiter introduces a degree of audio top cut which cuts off some of the higher audio pulses. Therefore it will be necessary to wire in a separate blanker switch. The placement of this must be left to the individual, bearing in mind my previous remarks on this subject.

As this blanker is as untuned device, it seems probable that it could be used on almost any type of transceiver or receiver with good results, although we have only tried it up till now out on the FT 200.

Perhaps one of our readers might be able to come up with a printed circuit board layout for it, and if so perhaps we could arrange distribution of it. Any takers?

*3 Fairview Ave., Glen Waverley, 3150

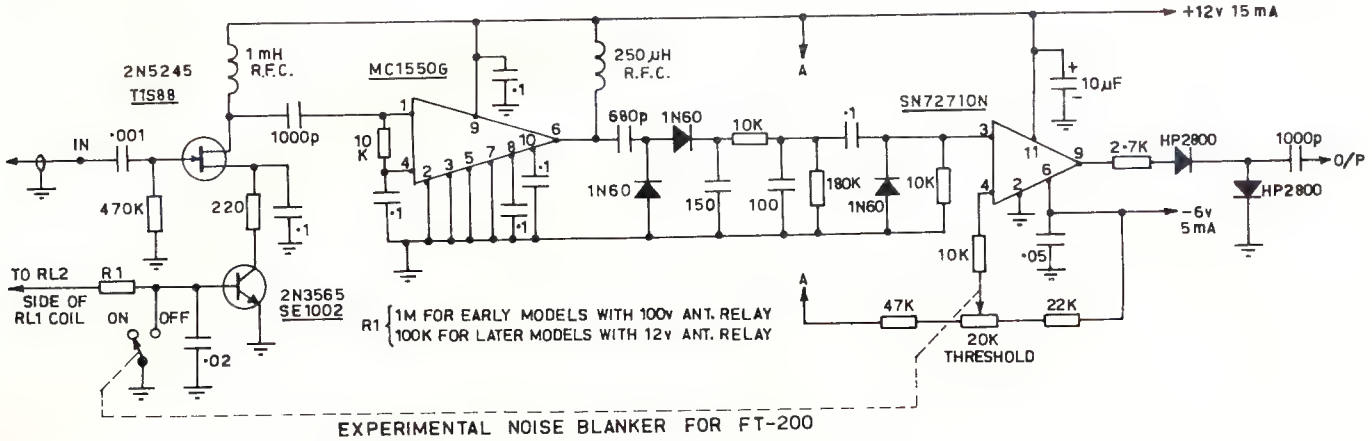


CONNECTION OF N. B. TO FT200

This month I am going to let the diagrams do all the work, so I can slip away quietly but not before I tell you about a few of the commercial modifications coming up.

Next month Yaesu again, but this time the FR50 receiver. A very neat and easy conversion to cover the 160 meter band.

Also, although it seems impossible, more modifications on the FT 200 including audio derived AGC which goes a long way towards overcoming some of the AGC problems in the earlier models. So until next month, good luck with your blankers.



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AMATEUR RADIO EQUIPMENT

in

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Phones 2566, 3111

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DO NOT address any further mail to the home address of the Fed. Awards Manager.

Letters to the Editor

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

The Editor A.R.
Dear Sir,

The following is a true story, only names and places have been changed.

Women In Action

This is a group for the old women in the community. At the moment they are busy reorganising the shelves in their house, but the owner of the house will not let them do it until they can agree on how the shelves should be organised.

They re-organised their shelves a few years ago, but this was when the shelves were not so full, with the result that everyone was happy. Now the process must be repeated, but problems have arisen. For example, recently they wanted to watch the Oscars, but were unable to do so because of shadows from their shelves.

The biggest member of the group insisted that this was not a problem, presumably because it was inconvenient for her to move the contents of her shelves. Despite this, servants were sent around the house to gather ideas, but no ideas suited everybody.

Now, some of them want to put objects on the shelves, but are reluctant to do so, for fear they may be forced to move them in the near future.

This problem may be "shelved" for the present, but it will surely arise again. Thus, let us hope that this situation is soon resolved, and that sensible actions overcome heated words.

73's,

Martin J. Fox VK7ZMF
Stephen D. Fraser VK7ZSF

The Editor A.R.
Dear Sir,

Just a note of appreciation to you and your assistants for the new look Amateur Radio Journal.

I have held a ticket since 1938 and have seen "AR" through many changes.

I feel the presentation and printing have improved greatly with the April 1973 issue.

Keep up the good work.

V. H. Leonard
(VK3PJ)

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The Editor A.R.
Dear Sir,

I enclose news items from the Illawarra Branch (Wollongong N.S.W.) and trust they may be of sufficient interest for publication.

Barry Hartley
Publicity Officer
Illawarra Branch

Illawarra Branch News

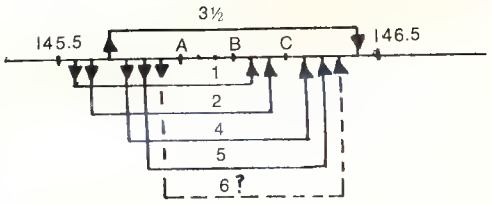
The Annual General meeting of the Illawarra Branch held at the Wollongong Town Hall in March summarisd the past year with reports of successful completion of three major ventures, being the Dapto Moonbounce project, the Wollongong Channel 1 repeater and the acquisition of club rooms at North Wollongong.

The repeater installation proved to be something of a physical challenge due to the terrain.

Located at Mount Murray on the eastern escarpment of the Southern Highlands of N.S.W. the tower and cubicle were positioned atop a 50 ft. rise to which all materials, pipes, concrete, sand water, etc., had to be carried by hand or bucket and conduit for power cables had to be laid in rock and shale. A 15 ft. tower base supports an 80 ft. mast which supports the gamma matched dipoles, receive at 80 ft. and transmit at 40 ft. A weatherproof cubicle houses the modified EX commercial repeater which provides CW. identification every five minutes which acts as a beacon and assists in turning receivers, etc.

Power output at this time is 10 watts and there is no de-sensitizing at all with both transmitter and receiver in the housing. Some de-sensitizing is experienced when the high power final (75w) is used and it is hoped that with adjustment of vertical separation of Antenna this will be minunized sufficiently to use high power permanently

While receiver sensitivity is far from optimum, (approx. 2uv) mobiles as far as Newcastle have worked into the repeater and mobile coverage is very good over most of the Sydney and Wollongong areas.



The Editor A.R.,
Dear Sir,

I am disgusted by the events which have occurred over the last six months, with respect to the 2M F.M. band plan. Ultimatums, unilateral action, vetoes, propoganda — are we radio amateurs or amateur politicians.

At the Federal Conference delegates went prepared to support the particular system advocated by their state and none other. The so-called compromise plan was so patently ridiculous that I am lost for words.

The one high point of events was the discussion between the VK2 and VK3 councils on May Day (not that the May Day plan is better than the others), but even this seems to have gone by the board.

Perhaps it is time to look dispassionately at the motives to be achieved by a new band plan. These are:

1. Clear the band 145.8—146.0 of Repeater operation.
2. VK5 was desirous of wider spacing between input and output frequencies.
3. The number of repeater channels should be increased.

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It is instructive to examine the Albury Plan and the May Day plan in the light of the above.

Albury Plan

Advantages

(i) 600 KHz spacing on all channels.

(ii) Existing Ch1 and Ch4 inputs retained.

Disadvantages

(i) All uses of repeaters (Ch1 and Ch4) will have to purchase one new crystal.

(ii) As ChB will be retained many users will experience difficulties with the Receiver band width required (1.15 MHz).

May Day Plan

Advantages

(i) Existing Ch1 frequencies retained.

(ii) Only 500 KHz receiver B.W. required.

Disadvantages

(i) Ch4 operators will need to purchase 2 new crystals.

(ii) Only 500 KHz channel spacing.

(iii) Ch3 input is ChC simplex.

National unity is far more important than 2M band usage, and if necessary one of the above plans must be adopted by all states.

However, there is a plan which achieves the desired aims, at lower cost.

The only frequencies which MUST be changed are those which fall in the band 145.8—146.0, viz. Ch4 output on 145.9. There is no reason to change the Ch1 frequencies or the Ch4 input.

Using the May Day plan as a basis 145.65 could be used as the "Ch3½" input and the proposed Ch3 dropped.

This still leaves six channels and only Ch4 operators will need to purchase a crystal. The band spread is within the capabilities of virtually all units in use by amateurs, and Ch3½ provides 750 KHz spacing between input and output for those who feel that this is necessary.

This system will facilitate the changeover, as only the minimum number of crystals must be supplied by crystal manufacturers, and the P.M.G. will be involved in a minimum of investigation and replanning of frequency usage.

Only one part of this plan is contentious — Ch6. It is suggested that this be allocated only when and if an international agreement is reached to reserve 145.825—146.0 for satellite use. If the full 200 KHz 145.8—146.0 is required, then Ch6 must be dropped. This still leaves five repeater channels (the Albury Plan only provides four) which should meet our needs for some time into the future.

I trust that you will examine the above recommendation dispassionately, and attempt to arrive at a solution which is in the best interests of amateur radio.

Yours sincerely,
Ian Binnie VK2ZIU

"20 YEARS AGO"

With Ron Fisher, VK3OM

TWENTY YEARS AGO. JUNE 1953.

The second of June 1953, is a date that will be recorded in the annals of history as depicting one of the most colourful historical and awe inspiring events of modern times — the Coronation of a Queen regnant — ELIZABETH II of ENGLAND. So opened the June Editorial.

However, back to technical matters, we find three interesting articles that have been well used over the years. Under the heading "Double Converting Disposals Receivers" are two sections, referring to two popular receivers of the day. The BC 348 by Frank O'Donnell VK3ZU (now operating under the call of VK2QC), and Command Receivers, by K. B. (Bud) Pounsett, VK3ABP. The BC348 was changed to include a 175 KHz second IF, while the Command finished up with 110 KHz second IF. Incidently, the article included a circuit of the Command Receiver if you happen to be looking for one.

The third article was a reprint from QST of November 1952, entitled "More Effective Utilisation of the small Power Transformer". It described the now familiar bridge rectifier set up, but as silicon diodes had not appeared on the scene use was made of two 6x5GT's and a 5V4G. I am sure a lot of amateurs of the time looked at the circuit with a great deal of suspicion. After all, here was a 110 mA transformer delivering a total of 160 mA's and we all knew that that just could not be done. Truly an article before its time. In "Bring Your Regulations Handbook Up to Date" was a full page of amendments up to 28th of February, 1953.

"Fifty Megacycles and Above", reported a good deal of 144 MHz activity, both from field days and DXpeditions to mountain tops. An interesting inclusion was a report of a contact via the moon between W4AO and W3LZD.

Today, if you want to stir up an argument, just mention novice licencing. In 1953 there were a few heated letters regarding the introduction of Limited Licences. One correspondant even suggested that people who qualified for the limited ticket, "Have no right to call themselves Amateur Radio Operators". Indeed.

One of the places where Amateurs mét in Melbourne in the late 40's and early 50's was Collins Radio Store at 409 Lonsdale Street. An advertiser in AR at the time, they have long gone. Even the building they occupied has been pulled down. I guess quite a few old timers bought their first bits there as I did.

CONTESTS

With Peter Brown VK4PJ

LOGS ... and you

Without doubt the most disagreeable part of a radio contest is making out the log in a form suitable to forward to the contest authorities.

Strangely enough it seems that generally the higher scorers enter the neatest logs ... some logs are so well done it seems a pity that they have to be discarded ... and one can expect errors to be a minimum.

I have been pleased, and proud of the average amateur, to note how few errors occur in logs received by me and I would be surprised if the operators were aware of their errors.

Consider the massive problem of the high scorers in ensuring that duplications are avoided. (It is no mean task checking either.) I asked a few "top scorers" of their methods and little that you or I could not devise came forth except that log keepers are invaluable.

I am looking for some scheme whereby log preparation for the majority is minimised so that we may get better returns and of course contestants work is eased.

One obvious solution is a statutory, or other, declaration that so many points have been scored.

Could we rely on our fellow who signs a declaration??

What do you think???

Anyhow think it over and in the meantime get ready for this year's Remembrance Day Contest when we have to return 700 logs or better. A suggested simplified log is as follows.

QSO No.	Dwe Time	Freq. Mode	Station	Sent R S T	Rec'd. R S T	QSL S R	Points
18/8	18/8	80	VK2AB	57001			
	9		BC	6 2			
	1900		3ZA	9 3			
	9		SB	5 4			
	18		XA	8 5			
	59		QC	5 6			
	2000		4AB	4 4 7			
	6	40		5 5 8			

Generally, unless the DATE, HOUR (tens of minutes) BAND, CALL AREA, or hundreds and tens of serial number changes, do not write in the log. Check a log and see how many units you can save by doing the minimum. This is only a suggestion to help you as overall I guess a log completed in detail is easier for me ... you are the customer. So many are doing this in various ways ... as long as there is no doubt it is OK with me.

If you make an error, as giving a serial number twice, just put a mark against the entry and count in your score. Don't do it too often though.

About the Remembrance Day Contest. We are out to make the big Friendly Contest better ... How will VK2 and VK3 make out?

C.W. Contest?

Quite a few mentioned, of the last Remembrance Day Contest, that they could not get a CW contact after a "phone contact". Of course there are not so many confident operators on CW. Also, more than once has come the suggestion for a CW contest. Could we try an unofficial CW contest for June and July so that the not so confident and others may get some practice for the RD Contest??

Time. 3rd Sunday, 17.6.73 and 15.7.73. 6 p.m. to midnight local, or 0800 to 1400 GMT.

Bands. 80, 40 and 20. Usual R S T. CW to CW only. VK call areas only.

Scoring. One point per contact. One contact per band per station.

Logs are not required ... just your call sign and total score with any comments you may wish to offer.

Results of your efforts must be in before the end of the month so that I can publish in August'Sept., "AR", space permitting. Of course if there is sufficient interest this could develop into an official contest ... it is up to you.

Contest Calendar

7th/8th July.
Z L Memorial Contest. 2000 hrs. to 2400 hrs. NZ time.
Each night. 0800 to 1200 GMT.
80 meters only. One contact per station. Usual R S T.
Logs to ZL2GX, 152 Lytton Rd., Gisborne, NZ.

18th and 19th August.
Remembrance Day Contest. The Friendly Contest.
Keep it the BEST contest by entering.
700 logs or bust.

HAMADS

- **A free service for individual members.**
- **Four lines of print free (200 characters/spaces); full charge at $6 (min.) per col. inch if exceeded or for repeats: includes name/address—use QTHR if correct in Call Book.**
- **Copy, please in typescript if possible, and signed.**
- **Excludes commercial-class advertising.**
- **Exceptions only by PRIOR arrangement.**

For Sale

National Organ Console with single keyboard and speakers but less electronic components. Best offer. VK3ZBS. B. M. Stares, 11 Malmesbury St., Wendouree, 3355.

Audio amp., chokes, valves, Power supply, Transceiver Type 3 $20, No. 62 $10. Ph. (03) 347 7491.

Swan 350 Transceiver 5 band, PSU. A1 cond. $300. VK3ZXB. Box 246 Mildura. Ph. (050) 23 2455 after 5 p.m.

Hydraulic drive complete with 3 phase motor 5/8HP 150V 50Hz infinitely variable both directions by remote servo. Suit moonbounce. Weatherproof $60. Ph. (02) 50 7937 Jones OR VK4LQ QTHR.

2 Mx F.M. Transceiver and frequency meter, suitable up to 2 Mx. Both in going condition. For new call. Greg Nieuwenhuis, 34 Bellevue Road, Figtree, N.S.W. 2525 Ph. (042) 28 8620

SSB Filter 455 KHz Mech., Xtal or Ceramic. Also 2 Mx, F.M. Mobile Transceiver. VK2ZXI. A. Wollin, 3 Kinsey St., Moama, 2739. Ph. (054) 82 3062.

FT101 160-10 Mx. 4 months old. What offers. Replies C/- D. Bell, P.O. Dangar Island, Brooklyn, N.S.W. 2253. Ph. 611 1335.

Marconi studio sync gen. BD.637D $80; Labcraft turntable type 605 with Decca Deram cartridge and arm $55; ½" Video tape rec., $350 o.n.o.; Solid-state TV camera $140; VW Kombi Van $400. VK2ZTY, Ph. (02) 30 4312.

Channelmaster Rotator complete. Suitable small beam antenna $35. VK3AOH, QTHR. Ph. (03) 49 6224.

SB34 Transceiver made by Sideband Engineers/Raytheon, in 1st. class condition, complete with book, microphone and plug-in VOX unit. Makes a complete station; you just supply antenna and either 110 colt AC or 12 volt DC. $300.00. VK3AHR QTHR. Ph. (03) 83 4203.

Drake TR3 Transceiver 5 band SSB-CW-AM comp. with ext VFO, mobile P.S. mike, etc. Perfect condition — $475 or TR3 $320, AC.PS $50, Ext. VFO $75, DC.PS $70, SPK unit $10 — also Heathkit Linear Warrior, as new with heavy duty 240/110V Transformer — $200. VK2ASA QTHR. Ph. Gosford 96 4231 (043).

Bendix frequency meter. LM13 type $20.00. Boom for commercial made 10.15.20 meter spider quad $3.00. VK3TG QTHR. Ph. (058) 52 1636.

Aluminium 20 Metre quad antenna $85; "S" power supply, 12V 550V DC complete $10; Command TX 4-5.3 MC $6; QST 1935 to 1972, all prices negotiable. VK3PW, Ph. (03) 50 6023 QTHR

Trio 59DE HF Rx, Practical Wireless and AR mods., SPKN. VK2ZZX, Ph. (02) 399 9077.

Drake 2B Hall HT37 and Linear Amp. Swan 240, Swan 240 VFO and TCU DC/DC Supply for Swan 350 or 500C, ATR2B T/R 3-8 MHz. ATR2C T*R 3-7-5 MHz. A.T.V. Transmitter, A VIDK on Camera. Pye Ranger 6 Mx., Pye Ranger 146, MR10 6Mx. Palec, VTVM, 144 Am Tx-Xtal and VFO. All band amateur Rx AM, CW, SSB. Lots more write for price list. VK2AJY QTHR.

Collins 75S1 excellent order $375. Heath HR10E. Amateur Band Rx. Inc. 100 KHz Cal. $135. Swan 500C Type Filter plus carrier crystals $25. Class "C" Freq. Meter & AC/PS $10. VK3OM QTHR. Phone (03) 560 9215.

Courier 25W Xistorised F.M. Transceiver Type F.M. 400/30 SCR522 Rx and PSU. Offers to T. J. Moloney 3 Laurence St., Manly 2095. A.H. Ph. (02) 94 3160.

Wanted

General Cov. Receiver HE30, old Eddystone or similar. VK3OM QTHR. Ph. (03) 560 9215.

Receiver ARC49. Good condition or any 150-160 MHz Rx. Details and Price to T. J. Moloney, 3 Laurence St., Manly, Ph. (02) 94 3160.

Signal Generator, Marconi TF801/A or similar 3-300 MHz. VK3YAZ QTHR. Ph. (03) 25 2689.

KEY SECTION

With Deane Blackman,* VK3TX

As do many others, the key section mourns the passing of VK7LJ. Lon was a noted CW operator, and as one of the original divisional co-ordinators has contributed very much to getting the section going. Vale, Lon.

Two entries in the CW section of the 72/73 Ross Hull — not many but a pretty significant improvement on the previous year when there were none. While congratulating 5MY on his total, perhaps I can express the hope that there will be a few more chaps round to talk to Ross 3DX next time.

Pictorial material is not a feature of a column like this, but the collection of keys held by AL 4SS is too good to describe so we have a photo. The collection dates back 100 years, and includes vintage overland telegraph "pumps", an assortment of "bugs", and some of the incredible variety of keys produced for military service. Al is anxious to enlarge his collection (or just talk about it!) — QTHR.

The "Lady with the Keys", says Al Shawsmith, VK4SS, is Lou Moreau, W3WRE. She is now searching for something Australian to add to her collection of over 200 keys and her forte is the history of each key in her possession. Al suggests if anyone could oblige why not write to her at 305 N. Llanwellyn Ave., Glenolden, Penn., U.S.A 19036.

SILENT KEYS

It is with deep regret that we record the passing of:

VK7RM—Mr. R. M. Barker
VK2RE—Mr. R. W. Edwards
VK2-SWL— Mr. W. A. Smith

BOOK REVIEW

With Syd. Clark, VKASC.

WIRE ANTENNAS for Radio Amateurs. Author. William I. Orr, W6SAI. For Beginner of Experienced Amateur, this book tells in simple terms, how to build and adjust wire antennas and feedlines with appropriate chapters covering just about every variant and the SWR meter for adjustment of the antennas and appropriate tuning units.
Publisher Radio Publications Inc.

"A Course in Radio Fundamentals". Author. George Grammar. One hundred and eighty pages of information for the newcomer to Radio. Twenty six chapters covering from the "Electric Field" to "Radio Frequency Amplification". Problems and questions are posed on each section of the work and the correct answers are given in a separate section of the book.
Publisher. American Radio Relay League.

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TWO METRE F.M. *from YAESU*

FT-2FB All Solid State TRANSCEIVER

Up-to-date advanced semiconductor techniques. 25 silicon transistors, 16 diodes, 1 SCR, 2 ICs, 1 FET.

The YAESU FT-2F opens the door to noise-free, broadcast quality two meter FM operation. And thanks to repeater stations in operation around the country, the two metre band is no longer limited to line-of-sight communications.

The FT-2F Transceiver is a highly advanced, all solid-state unit complete with an automatic tone-burst signal, with an on-off switch, for repeater actuation. The FT-2F has channel capability of 12 simplex or duplex frequencies. Three channel frequencies are included in the purchase price of the FT-2F. [Sets imported by B.E.S. will have simplex Ch. B and duplex (repeaters) Chs. 1 and 4 with crystals installed and aligned —six crystals.]

Advanced circuit design protects the rig automatically from the damage of transistors caused by antenna trouble, or reverse connection of the power line.

Nothing could be simpler than the operation of the FT-2F. Just select your channel and begin push-to-talk conversation with fellow two metre enthusiasts. A simple meter on the front panel indicates battery condition and relative power output. The meter automatically reverts to S meter operation in the receive mode.

Portable or home-base operation can be achieved with the addition of the optional FP-2 power pack. This AC power pack provides regulated DC power for the transceiver and charging voltage for optional leak-proof re-chargeable colloidal type batteries. In addition, a high fidelity elliptical style speaker is built into the pack. The FT-2F of course has its own self-contained speaker for independent use.

In the event of a disaster causing AC power failure, the FP-2 automatically switches over to DC operation from the battery pack. The battery pack will then provide up to eight hours of dependable emergency communications.

Like all YAESU Amateur gear, the FT-2F comes to you with our 90-day warranty. Plus all the hardware you need to get on the air immediately—mike, connectors, DC power cord and mobile mounting bracket.

A hand-held PTT microphone is included

If you have ever wanted to explore two metres, the time is NOW! And the rig is the YAESU FT-2F!

FT-2FB SPECIFICATIONS

GENERAL:
- Frequency Coverage: 144 to 148 MHz.
- Number of Channels: 12 Channels (three supplied).
- Modulation: Frequency Modulation.
- Transmitter Control: Push-to-Talk.
- Power Drain: Receive 0.5 amps., transmit 2 amps.
- Power Source: DC 13.5 volts, plus or minus 10%.
- Dimensions and Weight: 6⅝-in. w. x 2½-in. h. x 10-in. d.; 4 lbs.
- Standard Accessories provided: Dynamic Microphone, Connector Plug, DC Cord—Fuse, Mobile Mount.

TRANSMITTER:
- RF Output Power: 10 Watts (high position), 1 watt (low position).
- Frequency Deviation: 15 KHz. maximum.
- Frequency Stability: Plus or minus 0.001% or less.
- Spurious Radiation: At least —60 dB. below Carrier.
- Tone Burst: Nominal 2800 Hz.

FT-2FB SPECIFICATIONS (continued)

RECEIVER:
- Receiver Circuit: Crystal-controlled Double Conversion Superhet.
- Intermediate Frequencies: 10.7 MHz. and 455 KHz.
- Sensitivity: 0.3 uV. for 20 dB. S plus N/N Ratio.
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PRICE $259

FP-2 AC POWER SUPPLY SPECIFICATIONS
- Output: 13.5 volts, 2 amps.
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- Speaker: 5 x 3-1/5 inch.

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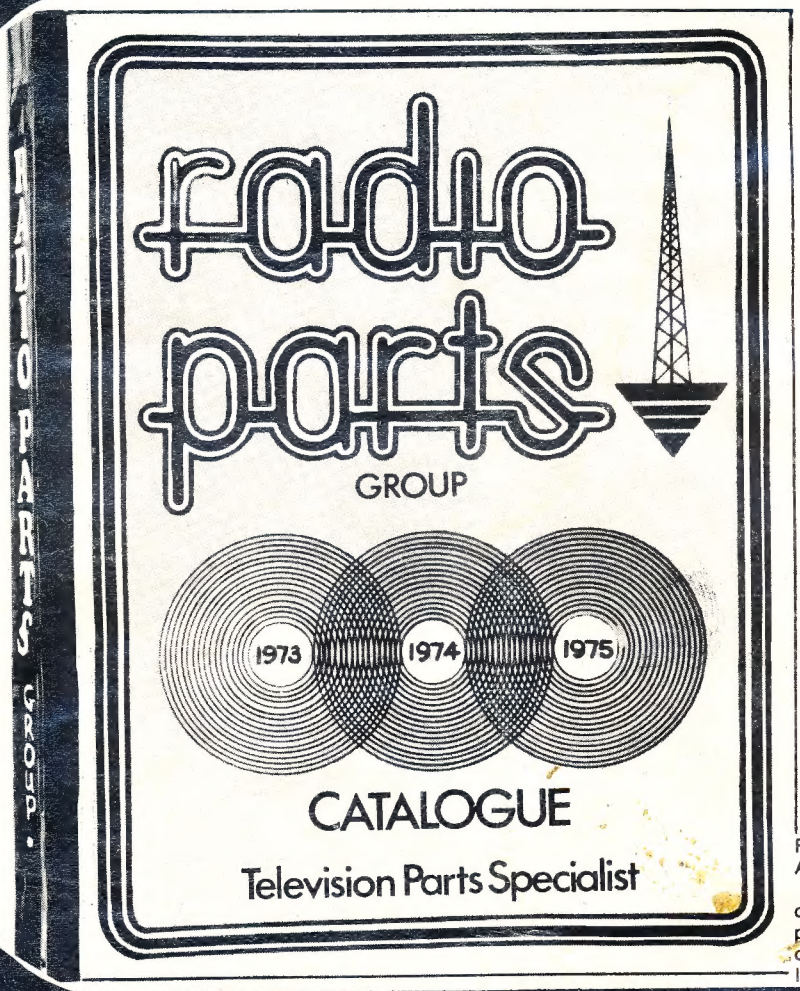

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